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The Present Epidemiological Basis of Environmental Sanitation*

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ENVIRONMENTAL sanitation is the oldest form of public health endeavor. To it can be attributed the reduction in cholera and typhoid fever, much of the reduction in summer diarrheas, control of many of the milk- and food-borne infections, elimination of yellow fever from certain areas, progress in malaria control, forward steps in elimination of industrial hazards—in short, some of the outstanding accomplishments of public health workers.

That sanitation should be the foundation upon which the modern superstructure of public health has been erected was the inevitable result of the evolution of concepts of infectious disease. As our predecessors conceived these to be due to inhalation of toxic emanations from decaying filth, early public health attention was logically directed at cleanliness of the environment. The advent of the era of bacteriology made possible the separation of the program into two components, the one with a specific disease prevention value, the other with mere esthetic value. It was thus possible to concentrate on those aspects that had health significance, rather than dissipate energies in attempts to attain mere cleanliness.

Although this concentration was desirable, it had, nonetheless, an unfortunate consequence for it led to a tendency to reject all measures that could not be shown to have specific value in disease prevention. "Clean dirt" was distinguished from "dirty dirt," and municipal sanitation was divorced from public health engineering. The sanitation program was reduced to what was often called "its bare essentials," and a notable local health demonstration was even begun without provision for sanitation.

Although I am in hearty accord with attempts to eliminate useless procedures, such as some of our ridiculous and almost barbaric quarantine requirements,

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I nonetheless submit that complete disregard of the esthetic aspects of environmental sanitation is not only illogical but even detrimental to public health progress. Many of these esthetic components have contributed immeasurably to our standard of living. The cleanliness of a community's streets, parks, food handling establishments and public buildings, including the public toilets, is a true measure of its standard of living. If we neglect these, we sink into a neglect of measures of greater importance. The standard of living is a vital factor in community health, important in the decline of many diseases, notably tuberculosis and infant diarrheas. I do not wish to belabor the point, nor have I time to be more specific. I do, however, wish to emphasize that in attempting to place environmental sanitation on a sound epidemiological basis we must not so completely lose sight of the intangible esthetic aspects that what we today consider progress through elimination of nonessentials is revealed tomorrow as a backward step.

Without losing sight of these esthetic elements, let us examine some of the present epidemiological bases for environmental sanitation. Since the recent issues of our JOURNAL suggest that there may be many shades of meaning applied to the term "epidemiological," I must define the limits of the term for this discussion. I conceive of epidemiology as the science of the occurrence of disease. It embraces consideration of all factors bearing on the development and prevalence of any disease condition. We must, therefore, examine the extent to which disease in the individual or the community may be influenced by the environment. Entire volumes have been written on only small parts of this broad topic. Here I may direct attention to only a few salient points.

Improvement in water supplies needs no justification. There is ample evidence of the relationship between specific contamination and intestinal infection. It may not be out of place, however, to point out the danger that our past triumphs may engender a smug complacency that will be periodically shaken by the recurrence of disease. We are constantly being treated to the unpleasant spectable of a public using with apparent impunity water that does not conform to accepted standards. There is danger that some of us may conclude that the standards are unnecessarily strict and not justified by current epidemiological experience.

To do so would be to display a fundamental lack of insight into the basis of these standards. Based on extensive experience showing that water with a certain degree of pollution cannot be drunk without risk of contracting typhoid fever, they presuppose a numerical relationship between the number of typhoid and colon bacilli in the sewage of a community. That this ratio is not the same for all communities or for long periods of time in the same community is well known to the epidemiologist. The community that has had much typhoid fever in the past 20–30 years has a higher ratio of typhoid to colon bacilli than has the community with a low typhoid record. It is not surprising, therefore, that the latter may use with impunity a water with a colon index that would be positively dangerous for the former. This does not mean that the standard is wrong but rather that the community is flirting with danger of future trouble if it disregards the obvious implications of the standard. The possible appearance of dysenteric infections if the standard be disregarded is also a threat that cannot be ignored. If we attach the least degree of esthetic significance to the drinking of water containing the living excreta of another man's bowel, the standard is also good.

The possible rôle of water in the development of other diseases is important to the engineer and epidemiologist alike. Discovery of the virus of poliomyelitis in the excreta of patients and carriers, and in the sewage of a community in which the disease is prevalent, naturally raises the suggestion that the disease is water-borne, and that added attention may have to be given to purification of water and disposal of sewage.

It should be pointed out, however, that the mere presence of microorganisms in feces does not mean that the normal mode of spread is via water to which sewage finds access. The organisms of tuberculosis and pneumonia may be found in feces and yet there is no evidence that either disease is spread by water that we drink or in which we swim.

Before we can assume the spread of poliomyelitis through water, we must show the occurrence of the disease to be consistent with such a hypothesis. It is to be regretted that too little attention has been paid to the wave-like character of spread, a phenomenon pointed out so clearly by the late Dr. Wade H. Frost as long ago as 1916. One cannot accept the concept of spread through water when he sees the disease spreading (like measles) as ripples spread from a stone dropped in a quiet millpond, the peak of incidence in contiguous geographical areas of a single city showing a regular progression from a focus—all this in an area with a single water supply. Personally I am aware of no outbreak of poliomyelitis in which the epidemiological evidence even suggests water as a vector to the exclusion of other channels of infection; on the other hand, I am familiar with innumerable outbreaks in which the water-borne hypothesis is absolutely untenable.

If on epidemiological grounds I would exclude poliomyelitis from the possible sphere of sanitary control, by the same token I would direct your attention to the possible rôle of environmental regulation as an element in the fight on dental caries. Although caries is obviously the result of the interplay of many forces, the metabolism of fluorine seems established as a factor of importance. The work of numerous investigators indicates a higher incidence of caries in a community drinking a fluorine-free or deficient water than in one using a water that will induce a low degree of fluorosis. Brekhus and Armstrong have found the fluorine content of the carious tooth lower than that of the non-carious. Only a few years ago fluorine was enthusiastically removed from water to prevent mottling of the teeth. Today we must consider the possibility of adjusting the content to a level that may inhibit development of caries and yet not induce fluorosis. Although much remains to be learned before the method is practical, I feel confident that the day is coming when fluorine may be added to some waters and subtracted from others with resultant benefit to dental health.

In the realm of milk sanitation, modern epidemiological concepts also support the basic tenets upon which our program is based. Unfortunately, however, much of our milk sanitation antedates careful studies of the "sources and modes of infection." It is not surprising, therefore, that many milk codes should contain items that are not easily justified. They may be defended on the ground that they conduce to a low bacterial count, yet the emphasis that is placed on nonessentials is too often at the expense of items of far greater importance. I refer to some of our haggling over barn design or location of manure piles to the disregard in many communities of an obvious need for pasteurization.

In a recent issue of *Harpers* a former Department of Agriculture employee

charges that some of the high price of milk is due to unnecessary sanitation: "For more than eighteen years the U. S. Public Health Service has been urging the universal adoption of uniform, sensible milk standards, but less than one-third of the nation's milk areas have thus far fallen in line." Had the author been less concerned with accusation, he would have had to add that a substantial part of the recalcitrant two-thirds has standards so far below those of the U. S. Public Health Service Standard Milk Ordinance that, in the words of one of our late associates "anything can be sold as milk that is white, pours and comes from a cow." To present the complete picture he would have also had to add that in at least one state the agricultural interests, in spite of health department opposition, forced adoption of grading legislation that precluded adoption of the standard milk ordinance. It is unfortunate that popular magazines should peddle half-truths to a gullible public.

Yet in the writer's charges there is nonetheless some element of justice. Overlapping inspection and too zealous exercise of local prerogatives often result in needless expense to the farmer without sanitary justification. It behooves us to appraise our milk regulations from time to time, not solely to make them more stringent but to determine if they rest on a firm epidemiological basis. I feel confident that most of them will stand the searching light of scrutiny but there are some that I know will not. Merely as examples of the latter I would cite regulations as to collection of milk bottles from homes with communicable disease and the sale of milk from farms where infection exists.

I recall visiting a home in which four cases of meningococcus infection had occurred over a period of as many months. As the house had been under constant quarantine, the milk bottles had so accumulated that they covered a large front porch except for a narrow path to the door. It was through this path that I walked with my portable incubator to carry throat cultures to the laboratory. I had to transport them in the incubator lest the organisms die in the March cold; yet apparently the board of health considered that they might live for weeks or months on dry milk bottles which were being accumulated for a final orgy of disinfection. If the usual cleansing methods are inadequate to treat bottles from the home where frank cases exist they are equally inadequate for those from homes harboring the more numerous carriers and missed cases. Either the measures are shockingly inadequate or these special precautions are unreasonable.

Somewhat similar considerations apply to measures of dealing with milk from infected farms. All too commonly this is excluded from even the pasteurization plant. I do not for a moment question the importance of excluding this milk from sale if it is to be distributed raw. In the case of a pasteurized supply the case seems to me to be different. I recently found considerable horror expressed over the practice of one state of permitting creameries to accept milk from farms where typhoid fever carriers reside. Yet I submit that if the process of pasteurization is inadequate to kill typhoid organisms where they are known to exist and suitable precautions taken to guard against their introduction into the milk, the same process is equally inadequate to destroy those that enter from unrecognized carriers. Epidemiological experience shows the process to be adequate. Nor do I know of any evidence that this more lenient point of view has resulted in disease—unless perhaps a phobia on the part of its critics.

In the field of food sanitation we also find practices that do not rest on sound epidemiological basis. At the risk of possible misinterpretation I must emphasize what should by now be a truism, that mere spoilage of food does not render it unfit for human consumption. The fondness of the sportsman for high game and of the epicure for certain cheeses belies the old presumption that protein decomposition products are poisonous. Personally I do not like my protein decomposed—beyond a certain point—and therefore welcome a food inspection that protects from the unscrupulous merchant who would attempt to defraud. We must, however, recognize this as fraud prevention, not as disease prevention. As fraud prevention it needs no apology; masquerading as disease prevention it stretches intellectual honesty to the breaking point.

I wish I could cite evidence that lack of decent cleanliness in the handling of dishes in food handling establishments is likely to result in demonstrable disease, for I should welcome a basis for enforcing better dishwashing in the restaurant and soda fountain. And yet I know of no convincing evidence of this character. This does not mean that we should relax in our efforts to achieve decent standards of cleanliness —standards that satisfy our better esthetic senses, bespeak a high standard of community cleanliness, and assure destruction of the pathogens likely to be spread through the mouth. It is better to seek these standards than to dissipate our efforts in attempting to achieve bacteriological sterility with complicated devices of more value to the manufacturer than to the public. In our hospitals we are even more illogical in that we often insist that dishes of the infectious patient be boiled for ten minutes. Can it be that when we increase the temperature from the 160° F. that is effective in the short-time, high-temperature pasteurization to the 212° F. of boiling we must increase the time from 20 seconds to 10 minutes? Or can it be that measures adequate for the dishes soiled by the unrecognized carrier are inadequate for those used by the recognized case?

The problem of waste disposal, and particularly contamination of bathing places, offers another situation in which we must fall back upon esthetics for support of current practices. I am not condoning dirty, filthy, or polluted swimming pools or beaches. We have a right to demand that the water in which we bathe is not mere diluted sewage. Common decency dictates cleanliness and needs no apology. Yet in setting up these standards we must not delude ourselves into believing that we will materially affect the incidence of communicable disease. I have heard many accusations as to the spread of disease through swimming, yet for none of these can I find evidence that is even presumptive. Respiratory diseases have been spread at beaches and pools, yet I see no evidence that this has been through water rather than direct respiratory exchange. Skin infections may well be spread through exchange of towels and bathing suits and conceivably by lying on a moist sandy spot recently vacated by a sufferer from such infection. I would not deny this possibility or even probability, but no one has suggested disinfection of the sand though many have urged disinfection of the water to prevent spread of impetigo. Some have even suggested that venereal diseases might be spread through the waters of bathing beaches. I would not deny that these diseases have been spread at the beaches but I insist that it is not through the medium of water. Sanitation of swimming pools and beaches is a matter of such obvious common decency that it needs no support from far-fetched

epidemiology. Unfortunately epidemiological experience cannot even assist in the determination of reasonable standards.

Industrial hygiene has probably made more progress than any other branch of environmental sanitation in its attempt to base control practices on a sound epidemiological foundation. Tolerances for specific chemicals have served as the basis for standards of concentrations to be permitted in the working environment. The fact that a dust-free or fume-free atmosphere was neither attainable nor essential has been faced realistically and control efforts directed at reducing concentrations below the critical levels determined by experience.

This is a refreshing contrast to the attitude too often displayed in certain other phases of public health control. The attitude to which I refer is that of sitting with the feet before the fire, some mental stimulant at the elbow, and thinking up regulations to control every conceivable hazard to which man may be exposed. Of course, it will be objected that the chance acquisition of a small dose of bacteria is of vastly more significance than of chemicals because of the former's capacity for reproduction. Yet as already pointed out the mere demonstration of the presence of bacteria in the environment does not imply epidemiological significance. Due consideration must be given to the problem of dosage and the capacity to infect when introduced by various portals of entry. We could profitably emulate our brothers in industrial hygiene and attempt to put some of our other control measures on a sound basis of experience rather than on mere theory.

Of the many newer aspects of environmental sanitation, the standards of housing seem to rest on especially insecure epidemiological foundation. I would not question the potential health significance of housing, and yet epidemiological data on which to base this belief are virtually nonexistent for poor housing cannot be separated from other attributes of poverty.

This inability to secure epidemiological support for housing standards should not discourage us from attempts to improve housing conditions or even to do so by regulation. Almost every community has houses that by no stretch of the imagination can be defended as desirable for human habitation. An appreciable fraction of our population lives under conditions that are undesirable socially, morally, and hygienically. Housing needs no defense nor need it await epidemiological support. It is important, however, that in our eagerness to effect improvements through use of regulatory power, we do not deceive ourselves as to the limitations of our knowledge. We must keep an open mind and be prepared to modify our standards in the light of future research; not attempt to defend the unreasonable on the basis solely that it is hallowed by tradition.

In presenting this brief discussion of the present epidemiological basis of environmental sanitation, I have purposely sought to avoid philosophical discussion of general principles. Rather have I sought to cite a few examples, chosen at random from varying fields, to illustrate the extent to which current practice may or may not rest on a sound epidemiological foundation. From your own experience you can each add countless examples. You can draw from fields that I have not attempted to touch, such as insect control. You can generalize far more than I have attempted to do. You will find, as I have already suggested, that on the one hand we have sought to base standards on epidemiological evidence that does not exist and on the other hand have ignored well established evidence. In short, we have been supremely human.

In acknowledging the lack of epidemiological support for many of our sanitary practices, I trust that I shall not be branded as an iconoclast, as I was so labelled in jest by one of your members a year ago. It would be Utopian if we could find sound basis for all measures of sanitation, but at present we cannot and I doubt if we ever shall. This lack need not deter us, however, from attempts to improve the sanitary standard of the community. Cleanliness is still next to Godliness and will always remain so. It needs no apology. It is essential, however, that we maintain a clear perspective if we are to preserve our intellectual honesty. This perspective requires periodic re-evaluation of our practices, elimination of the illogical and unnecessary without undue sacrifice of those esthetic components that conduce to that intangible yet highly valuable asset that we refer to as the standard of living.

Science and Government

A PRESIDENT may use the findings of scientific agencies in a truly scientific way—for the purpose of developing the soundest possible national policies. Or he may use these resources for the purpose of support for policies which have been predetermined by political considerations. As the primary seat of power, the President is in a position to exert pressure throughout the administrative personnel of the government. The scientific personnel in government departments may assemble the data required with true scientific objectivity; but they are usually debarred from interpreting the meaning of the data or formulating conclusions to be drawn therefrom. This, as previously indicated, is the function of the bureau chief who is nearly always a part of the political hierarchy. In short, scientific men can be scientific up to a point; and the point beyond which they cannot go is usuallly the vitally important point. Quotation from article by Dr. Harold G. Moulton, "Science and Government," in *Science*, Dec. 11, 1942.

A Physician Looks at School Dental Programs*

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MY purpose in this paper is to look back several years at our experience with developing an economical dental program in the Astoria School Health Study. In these days of civilian economy and rationing, procedures which bring results without increasing costs are, I believe, worth review. The full description of the dental program upon which my remarks are based is given in the published report of the Astoria Study titled "Solving School Health Problems,"[1] and also in several papers by Lifson.[2]

I make no claim that this program is unique. It is similar to one Turner[3] has successfully conducted in Malden for many years. I am encouraged to discuss it because now it may have more significance, since it has the virtue of being economical. I have not tried, even if it were possible, to evaluate this program by any of the criteria recently suggested by Knutson[4] in his constructive paper in the *Public Health Reports*, nor can the results be accurately measured as Kramer[5] has been able to do for his state-wide activities in Kansas. Most of the data are limited to one year's experience. They are based for the most part on examination and treatment by private dentists who, as you all understand, vary in their standards of work.

Nevertheless, I believe the experience deserves reviewing because it faced some very fundamental questions. They are questions which every public health dentist and school health administrator ponders: How can I develop an effective program without increasing the budget? How can I utilize the dentists of the community in the school dental program? How can I make the most effective use of a dental hygienist? What responsibility can the elementary school classroom teacher assume in dental follow-up? Is the school the place for the dental examination? From this experience, we found that the private dentist can and should have a more intimate working relationship with the school dental program; that elementary school classroom teachers were not as effective in securing dental attention for children in the primary grades as in the upper grades; that the dental examination does not belong in the school but in a dentist's office; that this program can operate without additional funds, when more effective use of existing school and community resources is made.

A DESCRIPTION OF THE PLAN

The operation of this dental program involves principally the teacher and the community dentists, with the school nurse playing a secondary rôle. The teacher has three responsibilities: (1)

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To inform all parents once each year that the child needs a dental examination; (2) To conduct systematic contacts with the home until the child receives attention; (3) To record on each child's *Pupil Health Card* the progress he has made during the school term in obtaining treatment.

The private dentists agree to give a dental examination to any child coming to their offices accompanied by a parent. The nurse's responsibility is to make a limited number of appointments in the school dental clinics and other available clinics for those children obviously clinic cases or who are recommended for clinic care by private dentists. It will be shown below that the plan would have been more effective if, for the primary grades, our procedures included a personal interview by the teacher or school nurse with the parents of those primary graders who do not respond to the teacher's letter urging a dental examination.

Four steps were necessary to initiate the program. Fortunately, at this time the two dental members of the District Health Officer's Medical Advisory Committee were the presidents of the two dental societies in the community. First, the program was explained by the District Health Officer to these two dentists. Second, these dentists called a meeting of all dentists serving the Astoria-Long Island City Health District and discussed it in open meeting. Third, after the coöperation of the community dentists was assured, the plan was proposed first to the district superintendent of schools and then to the eight school principals concerned. Fourth, a letter to be sent to each parent was formulated by the Study Staff and submitted to representatives of the dental profession and school authorities for approval. This letter carried the signature of the principal of the school attended by the child.

RESULTS

What were the results? At the end of the school year, 1937–1938, for which we have complete data, 88 per cent of the children in the eight schools participating in the demonstration had been examined by dentists. Private dentists examined two-thirds of the school registrations; supplied almost three-quarters of the treatment services; and were responsible for 82 per cent of the cases completing treatment. Treatment was found unnecessary for 21 per cent of the children examined. Parents of 1,859 of the children took no action. This is 29 per cent of all the children in the group. This figure includes 17 per cent found by a dental examination to need treatment but who did nothing about it, and 12 per cent who never availed themselves of the examination. An inquiry was made as to why parents did not take their children for dental examination or secure necessary treatment. About one-half the responses were classified as indicating lack of understanding or unwillingness to coöperate. The other large group were those whose excuse was economic need.

THE RÔLES OF THE TEACHER AND DENTAL HYGIENIST

When the results were analyzed by grades, we discovered that the lower the grade, the less dental care the children received. For example, 44 per cent of the children in the kindergarten never reached the dentist even to be examined. On the other hand, above the 4th grade 90 per cent or more in each grade visited a dentist. Thus, in the age group for whom protective dentistry is most important, the teachers' efforts were least successful. While these poor results may be explained by lack of appreciation by the teachers of the importance of early care of baby teeth and 6 year molars, it is likely that the parent influences the situation more in this younger group than in older chil-

dren. If parents do not believe that care of baby teeth is important, the primary school child is not likely to be taken to the dentist, regardless of the notes he may bring home from the school recommending a visit to the dentist.

This assumption is strengthened by two other studies made in Astoria in which the dental hygienist's efforts were compared with those of the teacher. A dental hygienist worked with 238 children in the 7th grade. Her procedure was to send a note to the parent and, if no visit was made to the dentist, to have one or two conferences with the child. Of all the children who received care by this plan, 90 per cent obtained it within 6 weeks after the dental hygienist's first note sent to the parent. Completed care was obtained for about 30 per cent of the children. Nearly 30 per cent of the children received no dental care in spite of the repeated efforts of the dental hygienist. On the other hand, we have already observed that teachers were much more successful with this upper grade group. A study made by Frankel,[6] using four schools in Astoria, supports the theory that the parent is the important factor in securing dental care for primary graders. Using schools which children of relatively the same economic status attended and using 1st, 3rd, and 4th grades, the children were examined by a dentist who determined the condition of their teeth at the beginning of the experiment and reëxamined them at the end of the 7 month period of the study. In three of the schools the teachers did the same follow-up work as has just been outlined. In the fourth school, a dental hygienist was used to interview the parents of those children who did nothing after the first note was sent home. It was found that, in terms of dental correction secured, the children where the dental hygienist worked with parents had received almost three times more dental care at the end of the 7 month period than the children in the schools where notes alone were employed.

I do not believe this conference method depends for its success entirely upon a dental hygienist. Any school health worker such as school nurse, physician, or teacher, who can meet the parent and discuss intelligently the value of dental care and demonstrate to the parent any obvious caries that need attention probably will be equally effective with this younger group. The result obtained by the teachers in the upper grades is, for practical purposes, quite satisfactory and indicates that for this age group the individual conference method is not essential to secure dental care for most of the children. This difference in the method of follow-up which must be employed, depending upon the age group of the children, is worth noting because today in the interests of economy and more effective use of limited professional personnel in the school program we need to know more than ever before where professional services must be applied to bring the greatest return.

SHOULD THE DENTAL EXAMINATION BE MADE IN THE SCHOOL?

The purpose of a school dental examination is to detect dental defects early so that prompt correction is possible. Yet reports indicate that dental caries is present in 80 to 90 per cent of all children.[7] It hardly seems like economical public health practice to spend time, which is money, in the examination of hundreds of children in order to single out the small group of children with sound teeth, and these teeth might not be free from caries if x-rays were taken. If this examination were to be made in a dentist's office, which is the usual place for treatment, it would be of greater educational value. The school's job regarding dental health is to educate every child in proper dental practices.

Is the school fulfilling this function effectively when it teaches children to depend upon the school for dental service, knowing that this paternalism will end at graduation? It would appear to be better policy for youth to learn while it is still in school the path to treatment facilities in the community. Youth should also learn that dental fillings are worth paying for.

In defense of the dental examination in the school it is admitted that it may identify the serious cases which need attention sooner than others. It is said that these are the very cases which are most likely to ignore the advice of the school if all it does is urge a visit to the dentist to be examined. Again it probably comes down to a question of what is available in the budget and what policy is likely to result in the greatest good for the greatest number.

THE PRIVATE DENTIST'S PART

As soon as one thinks of the private dentist being brought into more active participation in the school dental program, he thinks of all the reasons for excluding him. These are the same objections which many school medical administrators voice regarding the participation of the private physician. Prominent among the reasons are: (1) The great variation among private physicians in examining technic; and (2) lack of interest in children's health problems; (3) poor coöperation with the school; (4) inadequate record keeping. These are not insurmountable. Morris[8] has answered these objections in his work with organized dentists in Michigan. We saw the solution as soon as we brought the Astoria dentists together to discuss the program.

It was during the first open meeting, I remember, when the dentists discovered and discussed their differences in examining technics. The dentists who used bite wing x-rays strongly urged that procedure be used by all. There were many dentists who believed that the explorer was adequate. This is a technical problem which the Study considered had to be solved by the dentists. But it illustrates the opportunity for "painless" professional self education which a plan of this type offers. Along this same line were problems of standardization of the examination with respect to reporting of defects and the keeping of uniform records. There were some dentists, after a few months' operation of the program, who felt that the examining job should be carried out by a select few from the dental society members and that the examinations might be made in school. Before the program had been under way very long, some of the dentists complained of overcrowding their offices; others, who were located in the poorer sections of the district, got very few pay patients out of the examination program. There were, at the end of the year, many who reported that they had received many new patients through this program. Another interesting observation was that the private dentist completed treatment much more promptly than the clinic dentist. Actually, of all the children who completed treatment during the year, 82 per cent were finished by private dentists.

These developments are symptoms and signs of the learning process. Our plan had deficiencies, but the most important thing, to my mind, is that we succeeded in getting the dentists interested and participating. The slow process, the mistakes, the bickerings, all are healthy and necessary stages in the education of any body of private practitioners entering upon a group project.

In school health work the private practitioner can, in most communities, participate in the program more than he does. Even in communities where school dental clinics are highly organized, service is rendered to only a fraction of the children. And the need for service is

very great. McCall finds that many children have one or more decayed teeth at 2 or 3 years of age. Klein and Palmer show that the permanent teeth of children under 14 years of age are decaying as fast or faster than they are being filled.[7] Eight out of ten N.Y.A. youths were found to have untreated dental caries.[9] While some proportion of these children are in families who cannot pay anything for dental care, the per cent is not as large as some would have us think. Many children included in the data just cited are in families who can afford dental care, while in their community are dentists who are not busy. I think the basic problem is one of maldistribution. On this point Sandler[10] says, "Only a small percentage of the children who can afford dental service actually receive it and there are few dentists who do not waste many precious hours waiting for for patients." East[11] has found that non-relief families spend about $9 a year for dental care, although they spend $24 for tobacco. More than half the families of the United States, not including those on relief, spend nothing for dental care. Certainly with the national income breaking all records in most communities today there should be but few families who cannot afford expenditures for protective dental care if they believe in it.

From our experience not only in Astoria with school children, but in the Metropolitan Life Insurance Company with 15,000 clerical workers in the New York Home Office, much can be done to increase dental service by educational means. The Dental Division of the company reports that company employees receive almost twice as much dental care as the people in the highest income, studied a few years ago by the Committee on the Cost of Medical Care.[12] Dr. Dunning, Director of the Dental Division, says that this is due not to any higher cavity rate among Metropolitan employees but is genuine evidence that individuals can and will afford a larger proportion of dental service under stimulation than they would be likely to think they could afford without such stimulation. Morris[13] says that the relationship between the economic status and the willingness of the family to pay for the treatment is not as close as we generally believe. He says the Kellogg experience in Michigan has demonstrated that it is first necessary to educate the family as to the value of dental service, and at the same time to educate them that it is a service they should pay for. He adds also that they have not observed any tendency for families to relinquish the responsibility for payment as the child gets older. He goes on to say that last year economic conditions in the areas where the Kellogg program functions have been a great deal better than they have at any time since the program was initiated. The reports this year, he says, will show a tremendous increase in the number of private patients.

We shall achieve the goal of protective dentistry and preventive medicine when the individual practitioner understands these objectives. The protective dentistry and preventive medicine of a community is only as good as the work of the private practitioners in the community. We, public health physicians and dentists, must bear in mind that the private practitioner is the man who must apply our theory to the individual. Our ideals of early protection and correction of defects and regular health supervision are so many words unless the individual practitioner who sees the public, too late many times, both in dentistry and in medicine, understands these concepts. The best way for him to understand is through active participation in programs which are based on these ideas.

To interest the professional man in the health program, he first must be-

come aware of the significance of the problem in his own community, and then be willing to spend time and effort to analyze the problem and participate in trying to solve it. Those of us in public health have a responsibility to encourage our colleagues in private practice to participate in community activities. The average practitioner of medicine and of dentistry has not been taught as a part of his professional training how to join hands for a common objective. The nature of his work and of his income makes him an individualist. This is particularly true of the dentist. He is too occupied, and necessarily so, to take the initiative in such community projects. This deprives him of experience which he should acquire in order both to adjust to new circumstances, and to have a hand in shaping his own destiny as well as that of his profession. The approach to the dentist or physician is through his society. The better organized the society, the more likely is the prospect of developing interest and action.

I think public health dentists have made notable progress in this respect. For example, in the seven counties in Michigan where the Kellogg Foundation, under the direction of a dentist, has been financing community health service through county health departments, dental and medical service for school children is conducted entirely by the local practitioners.[14] While this is probably slower as a method of securing a uniform high quality of work from the participants, nevertheless it seems to me far superior as a long-range objective than the introduction of clinic services which compete with the private practitioner and aggravate this problem of distribution and delay the day when all private practitioners will practise prevention as well as cure.

The dentists in Astoria are no different from professional men anywhere in this country. Many were suspicious of the plan, seeing it "State dentistry." Some saw the variation in the quality of examination and treatment which would be given by different dentists. Others thought the Health Department should pay the private dentists for the service, and other proposals were made at the meetings when we discussed the plan with the community dentists. The fact that 17 per cent of the children who were examined did not return for treatment can be laid at the door of the examining dentist. But these are not irreparable faults: they are a challenge to our leadership. Morris,[8] directing the Kellogg Foundation activities with private dentists in Michigan has used these as teaching opportunities. The dentists through their own organization can correct these deficiencies.

No claim of perfection is advanced to describe this Astoria program. It did place many children under dental care; it gave the teachers a concrete objective in their health teaching; it indicated that, in order to secure dental care for the younger age groups, individual conferences with parents are more necessary than with older children. It tended to distribute more efficiently the limited clinic services available in the district; it permitted a large number of practising dentists to participate for the first time in a public health effort, and most of them increased their clientele.

It is possible that in the future other solutions of this problem will come through the development of insurance schemes. Several have been suggested, but none, to my knowledge, are in actual operation. One of the factors which seems to operate against the development of dental insurance is that dental needs are too predictable on the part of the individual policy holder. There is practically no expectation of a cataclysm in the dental field such as medical patients might be willing to anticipate by the payment of premiums throughout long periods of good health.

Except perhaps in those communities where war industry has overwhelmed all available dental facilities, we cannot think today of expanding clinic facilities. We must aim toward using the already available dental man power and equipment 100 per cent of the time. The first step in that direction is to bring the private dentist into more active participation. We must avoid any duplicating or competing effort. By virtue of its educational functions and the population group it serves, the school health program exerts a strong influence on the entire health program. Wise leadership will promote the use of already existing facilities for protection and preventive health services. If services must be supplied by the school, it should not become a competitor of the community dentist, but supplement gaps he cannot fill. Too readily administrators accept the idea of a deficiency without being resourceful. As in many commodities today, a real shortage may not exist but be based on faulty distribution. Officials whose job it is to break these bottlenecks and improve this distribution problem are called "expeditors." We need more "expeditors" in our public health program.

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Salmonella Typing in a Public Health Laboratory*

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THE salmonelloses of human origin have long been a subject of study and an object toward which control measures have been directed by public health workers. It is one of the outstanding triumphs of the public health profession that widespread epidemics of typhoid and paratyphoid fevers (the salmonelloses of human origin) are, in general, things of the past. The sporadic case and the undiscovered carrier still persist and are considered important enough for painstaking epidemiological investigation.

A somewhat different attitude exists toward those *Salmonella* infections of man which are of animal origin. As a general rule, those infections attract notice only when a group of people are made ill with an acute infective process following the eating of a common meal or common food. In such outbreaks, generally termed food poisoning or acute gastroenteritis, the causative agent is frequently isolated but the epidemiological investigation seldom elicits adequate proof of the chain of events leading to the specific contamination of the food.

Generally speaking, even less information is forthcoming from investigation of the sporadic case of infection with a *Salmonella* of animal origin. Yet these infections are very common and are sometimes severe and of long duration, ranging from the subclinical case to a true typhoidal syndrome. In infants and young children the illnesses produced may be violent and fatal with invasion of any tissue or organ.

Much of the failure to arrive at epidemiological conclusions on which to base control measures may be traced to slow and inadequate laboratory work. This in turn often stems from a commendable caution on the part of the laboratory worker in passing a final opinion on the nature of an organism which cannot be identified rapidly and exactly with materials available commercially. Perhaps more frequently the cause is the tendency of many laboratories to arrive at a diagnosis of "Paratyphoid B" too readily or to class all *Salmonella* cultures except typhoid strains in some pseudo-generic category such as "paratyphoid-enteritidis group." The former designation, when incorrect, results in confusion since it may place emphasis upon the wrong epidemiological approach, and the latter gives too little information for satisfactory follow-up work since the group is ubiquitous in the animal world and,

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when applied in so loose a manner, may erroneously include "paracolon" and other organisms of doubtful significance.

Serological classification of the *Salmonella* group is the only logical and complete manner in which a laboratory can meet the problems involved and give true direction to the epidemiologist and to the administrator. Not every laboratory, probably very few, can furnish this service in detail, but many can and should be equipped to do enough serology to identify the main somatic groups of the *Salmonella* genus and to distinguish between the few types of human origin and the many of animal origin. In the United States, this involves as a minimum the serologic recognition of 4 somatic groups, the identification of the typhoid organism and the separation of the true paratyphoid B organism, *Salmonella schottmuelleri*, from the frequently encountered strains of animal origin, principally *Salmonella typhimurium* and certain members of the *Salmonella choleraesuis* group. Even this minimum service will give basic information of real value about 99 per cent of the cultures isolated.

A similar situation was satisfactorily met by public health laboratories when serum therapy was the only accepted specific treatment for the pneumonias. It is now generally recognized that our pneumococcus typing methods were inadequate since we were aware of only 30 pneumococcus types when at least 50 are now recognized (Kauffmann, Mørch and Schmith [1]). Certainly if the effort of maintaining about 40 carefully standardized diagnostic sera for that work was practical, it is just as practical to maintain the smaller number of sera needed for recognizing the main somatic groups of the *Salmonellae* and for identifying completely the more common types of importance in human medicine.

The following description briefly summarizes the methods used in Connecticut and the results obtained. The authors have had the benefit of advice freely given by Dr. P. R. Edwards of the National Salmonella Center, Lexington, Ky., who is mainly responsible for the manner in which our serological routine has been evolved, who has furnished us with authentic cultures of the various types and who has typed those strains which we have been unable to identify completely.

IDENTIFICATION OF SALMONELLA GROUP BY CULTURAL AND PHYSIOLOGICAL CHARACTERISTICS

Satisfactory isolations are made from fecal specimens collected in 30 per cent glycerol—0.6 per cent salt solution which is also suitable for the dysentery group. Fecal suspensions are plated on bismuth-sulfite, SS and MacConkey agars both directly and after enrichment in Selenite F. Preliminary identification of *Salmonella*-like colonies is made on the basis of reactions in Kligler iron agar modified by the addition of 0.1 per cent sucrose. After replating for purity the usual tests are made: Gram stain; motility; Voges-Proskauer, indole and hydrogen sulfide tests; fermentation of glucose, lactose, sucrose, and salicin and of other carbohydrates as necessary; and fermentation of dextro-rotatory tartrates.

Positive indole or Voges-Prosgauer tests or fermentation of lactose or sucrose exclude the organism from the *Salmonella* group and in general the same is true of salicin fermentation. For exclusion of a true diphasic paratyphoid B strain, utilization of tartrates is a criterion which is seldom wrong and which gives an indication of the probable animal origin of the culture. Serological identification can be made immediately after the purity of the culture is assured and after the organism has been tentatively placed in the *Salmonella* group by means of the tests described above.

ANTIGENIC ANALYSIS

Method for the Diagnostic Test—The methods for serologic typing are essentially those of Kauffmann.[2] For the somatic grouping, an alcoholized antigen is used in a slide test. Flagellar reactions are determined with a formalinized broth culture in a tube test after incubation at 50°–55° C. In all cases satisfactory results depend upon proper standardization, and adsorption if necessary, of the typing sera.

Somatic antigens are prepared by emulsifying the growth from an 18–24 hr. agar slant in 1 ml. of absolute ethyl alcohol. The suspension is heated at 60° C. for 1 hr. to inactivate the flagellar components, centrifuged and drained. The sediment is then suspended in about 0.5 ml. of 0.85 per cent salt solution. The test is made by mixing a drop of antigen with a drop of the typing fluid on a glass slide and tilting back and forth for 1–2 minutes. Agglutination is then read macroscopically.

Flagellar antigen is made by adding to an 18–24 hour, actively motile broth culture an equal volume of saline containing 0.6 per cent formalin. For the test, 1 ml. of antigen is added to a tube containing 0.01 ml. of the standardized serum and the mixture is incubated at 50–55° C. Tubes are observed for floccular agglutination at the end of 1 hr. and again after 2 hrs. If tests are incubated for more than 2 hrs., somatic agglutination may yield confusing results.

Preparation of Immune Sera—Cultures for rabbit immunization should be plated and checked for smooth colony form. When diphasic cultures are used the strain should also be stabilized in the proper phase, if necessary by cultivation in semi-solid agar containing serum of the type to produce the desired phase variation (Wassen,[3] Bruner and Edwards [4]).

For immunization, motile broth cultures are formalinized (0.3 per cent) and injected into rabbits in 0.5, 1.0 and 2.0 ml. doses at 5–7 day intervals. In nearly all instances 3 injections yield sufficiently potent sera and rabbits can be exsanguinated in 2 or 3 bleedings giving a total serum yield of 75–100 ml. per rabbit. Sera and typing fluids are preserved with 0.5 per cent chloroform or 0.5 per cent phenol.

Standardization of Sera—For diagnostic typing of *Salmonella* cultures, sera must be used in dilutions which give specific reactions with the main antigens present in the various *Salmonella* types. For somatic tests, titrations are made by the slide test technic described above, using 1:10, 1:20, and 1:40 dilutions of serum, each tested with representatives of the various somatic groups. The dilution which gives a rapid and strong, yet specific, reaction is selected for the typing fluid; a 1:20 dilution is usually satisfactory. For example, serum for the B group may give some cross with the XII antigen of the D (typhoid-enteritidis) group in 1:10 dilution but in 1:20 or higher dilution may react only with the IV and V antigens. Adsorbed sera may be necessary to distinguish between subdivisions of a group as in the case of the E group, all members of which contain somatic antigen III in association with either X, XV, or XIX. If dilutions of the sera will not yield typing fluids specific for the X and XV components, the III antigen must be removed by adsorption. Adsorptions of other somatic antisera have not been found necessary for diagnostic typing.

Sera for flagellar reactions are standardized by the tube test. The serum is tested undiluted and in serial dilutions with representative strains having one or more antigenic components in common with the immunizing strain, including antigens of both phases if the culture is diphasic. The dilution specific for a single flagellar antigen, or for a combination which is of diagnostic value, is selected as the typing fluid.

Adsorbed monovalent sera for flagellar antigens, especially for the nonspecific factors 2, 3, 5, 6, and 7, are needed for strain differentiation in occasional instances. For example, *Salmonella oregon* and *Salmonella give* differ from closely related types by only one of several components of the nonspecific phase. Other instances in-

volving either phase of certain diphasic types and even a few monophasic types could be cited.

Application to Diagnostic Typing—At the present time there are 109 types, excluding coliform types,* which have been described in the *Salmonella* genus. These include somatic antigens I–XXXIV and some 64 flagellar antigens. Additional types are continually being added to the list. While the prospect of diagnostic typing may at first appear impractical, actually the majority of types which will be encountered can be classified with relatively few sera.

Table 1 shows the types used for production of sera for somatic grouping that are in use in Connecticut. The same results can be obtained by using other types to obtain comparable sera. Adsorption has been necessary only with the X, XV, and Vi typing fluids. With an unknown culture, agglutinations are made first with the 8 typing fluids covering somatic groups A–E and their subdivisions. The C group can be split readily into the VI–VII and the VI–VIII divisions by using VIII serum (*amherstiana*). The E group likewise is divided into its 3 subgroups (III X; III XV; III XIX) by agglutination in specific typing fluids. The cultures which do not agglutinate in the 8 sera are tested with the remaining somatic sera. The table also illustrates the manner in which somatic grouping sera may be used for flagellar typing fluids.

Once the somatic group has been determined, sera for the flagellar reactions may be selected readily. Reference to a

TABLE 1

Salmonella Types Used for Antiserum Production

Somatic Groups	Type	Antigenic Formula*	Diagnostic Components Utilized	Phase Used
A	*paratyphi*	(I). II. XII; a — ———	I. II; a	(monophasic)
B	*schottmuelleri* var. *Java*	(I). IV. V. XII; b — ——	IV. V; b	(monophasic)
C	*choleraesuis* var. *Kunzendorf*	VI. VII; —— — 1, 5· · ·	VII; 1, 5	(monophasic)
	amherstiana	VIII; lv — 1, 6· · ·	VIII; 1, 6	Phase 2
D	*typhi*	IX. XII. (VI); d — ——	IX. XII; d	(monophasic)
E	*london*	III. X. XXVI; lv — 1, 6· · ·	X; lv	Phase 1
	new brunswick	III. XV.; lv — 1, 7· · ·	XV; 1, 7	Phase 2
	senftenberg	I. III. XIX; gst · · — ——	XIX; gst	(monophasic)
Others	*typhi* VII	(IX.) (XII.) Vi; ——	VI	(non-motile)
	rubislaw	XI; r — enx· · ·	XI; r	Phase 1
	worthington	I. XIII. XXIII; lw—z	XIII. XXIII; lw	Phase 1
	onderstepoort	(I) VI. XIV. XXV; eh—1, 5· · ·	XIV. XXV; eh	Phase 1
	kvitting foss	XVI.; b—enx· · ·	XVI; enx	Phase 2
	kirkee	XVII; b—1, 2· · ·	XVII; 1, 2	Phase 2
	cerro	XVIII; z_4· · · — ——	XVIII; z_4	(monophasic)
	kentucky	(VIII.) XX; i—z_6· · ·	XX; z_6	Phase 2
	minnesota	XXI. XXVI; b—enx· · ·	XXI	Either
	tel-aviv	XXVIII; y—enz_{15}· · ·	XXVIII; enz_{15}	Phase 2
	ballerup	XXIX. Vi; z_{14} — ——	XXIX. Vi; z_{14}	(monophasic)
	urbana	XXX; b—enx· · ·	XXX.	Either

* Antigenic components in parentheses may be lacking.

* Kauffmann (loc. cit.) lists several (*S. coli* 1–5 and *S. arizona*) in his diagnostic Schema. The authors are not in agreement with this terminology although recognizing the occurrence of *Salmonella* antigens in other genera.

list of *Salmonella* types† will show what flagellar antigens occur in the various somatic groups. The most nearly complete list is given by Kauffmann.[2] Preparation of 10 sera in addition to those also used for somatic typing fluids has yielded a representative group of sera by which all strains that have been isolated in Connecticut can be typed. Included in the group, in addition to those shown in Table 1, are sera for flagellar antigens c, fg, i, k, mt, gom, y, z, and z_{27}, and adsorbed single factor sera for phase 2 components 2, 3, 5, 6, and 7. This list is by no means complete, yet will probably need little revision for use with cultures isolated in other sections of the United States. For the minimum service, flagellar sera for b, d, i, and a nonspecific phase antigen only are needed.

Salmonella cultures frequently have been found upon isolation to be entirely in one phase. In instances when these are not recognizable as monophasic types or cannot be identified unless antigens of both phases are known, phase variation can readily be produced by growth in semi-solid agar containing flagellar antiserum homologous to the phase isolated.[3, 4] Rarely an adsorption with the unknown strain has been necessary to identify the flagellar antigens. It is to be expected that occasionally a new type of *Salmonella* may be encountered. In these instances, assistance by a National Salmonella Center is essential.

SALMONELLA TYPES IN CONNECTICUT

Salmonella typing was started in 1939 in the Bureau of Laboratories with two objects in mind: (1) to differentiate between true paratyphoid B (*schottmuelleri*) strains and similar types of animal origin, and (2) to determine the somatic groups to which other strains belonged. Hence, during 1939 there were a number of types which were identified as to somatic group only. During the latter portion of that year, certain cultures were submitted to the National Salmonella Center, Lexington, Ky., for identification. During 1940 the service was expanded and has since been amplified until there is now little need to use the services of the Salmonella Center except to confirm results or to study new types.

Table 2 shows the *Salmonella* types obtained over a period of 45 months (January 1, 1939–September 30, 1942). The two types of human origin, *typhi* and *schottmuelleri*, comprizing 56.7 per cent of the total number, are listed first. In all, 23 additional types, presumably of animal origin, have been recognized. Four of these (*california*, *pullorum*, *worthington*, and *kentucky*) were the first recorded and amply confirmed isolations from man. Two others (*hartford*[5] and *simsbury*[6]) were new types never before described but the transiency of the carrier state observed in these cases suggested that these are strains of animal origin. Most of the strains of animal origin listed are frequently encountered in fowl in the United States.

The majority of the animal types were associated with acute infections ranging from mild diarrhea to protracted febrile illnesses similar to typhoid fever. An occasional culture was isolated from an individual apparently in good health. Four types, *california*, *senftenberg*, *simsbury*, and *kentucky*, each represented by only one isolation, were not associated with illness.

Chronic human carriers of animal types have been rare in our experience. The convalescent carrier state was usually of short duration but occasionally it extended over several months. Two individuals have yielded

† The following should be added to Kauffmann's list:
S. simsbury — I. III. XIX; z_{27} — ———.
S. javiana — IX. XII; 12_{28} — 1, 5. . .
S. tennessee — VI. VII; z_{29} — ———.

TABLE 2

Salmonella Types Isolated from Man in Connecticut
January 1, 1939–September 30, 1942

Type	Antigenic Group	Diagnostic Antigenic Formula: Somatic Antigens	Diagnostic Antigenic Formula: Flagellar Antigens, Phase 1	Diagnostic Antigenic Formula: Flagellar Antigens, Phase 2	New Isolations by Years: 1939	1940	1941	1942 (9 Mo.)	Total New Isolations (45 Mo.)	Per cent Total Isolations	
typhi	D	IX. XII. (Vi)	d...	———	19	49	39	39	146	(40.8)	56.7% of human origin
schottmuelleri	B	(I) IV(V) XII	b	1, 2...	23	25	4	4	57	(15.9)	
typhimurium		(I) IV(V) XII	i	1, 2, 3...	..	24	13	16	53	(14.8)	
derby		(I) IV XII	fg...	———	..	1	..	2	3	(0.8)	
bredeney	B	I IV (XXVII)	lv	1, 7...	..	1	..	..	1	(0.3)	
california		IV XII	gmt...	———	..	1	..	..	1	(0.3)	
schottmuelleri var. Java		(I) IV (V) XII	b	———	..	..	..	1	1	(0.3)	
montevideo		VI VII	gms...	———	..	4	5	6	15	(4.2)	
oranienburg		VI VII	mt...	———	1	2	4	4	11	(3.1)	
bareilly		VI VII	y	1, 5...	..	2	4	1	7	(1.9)	
choleraesuis var. Kunzendorf	C	VI VII	———	1, 5...	..	..	4	1	5	(1.4)	
hartford		VI VII	y	enx...	..	1	..	..	1	(0.3)	
newport		VI VIII	eh	1, 2, 3...	3	2	5	5	15	(4.2)	
oregon		VI VIII	d...	1, 2, 3...	..	..	..	3	3	(0.8)	43% of animal origin
panama		(I) IX XII	lv	1, 5...	1	..	4	3	8	(2.2)	
enteritidis	D	(I) IX XII	gom...	———	..	..	4	..	4	(1.1)	
sendai		(I) IX XII	a	1, 5...	..	..	1	..	1	(0.3)	
pullorum		IX XII	———	———	..	..	1	..	1	(0.3)	
give		III X XXVI	lv	1, 7...	..	2	2	..	4	(1.1)	
anatis		III X XXVI	eh	1, 6...	..	2	..	2	4	(1.1)	
meleagridis	E	III X XXVI	eh	lw	..	..	..	1	1	(0.3)	
senftenberg		I III XIX	gst...	———	..	1	..	..	1	(0.3)	
simsbury		I III XIX	z_{27}...	———	..	..	1	..	1	(0.3)	
worthington		I XIII XXIII	lw	z	..	..	1	2	3	(0.8)	
kentucky		(VIII) XX	i	z_6...	1	..	..	..	1	(0.3)	
unidentified	B C D				10	..	..	..	10	(2.8)	
Totals—all types					58	118	92	90	358		

positive stool cultures for *S. bareilly* and *S. worthington* respectively for more than one year; neither of these was acutely ill just prior to the first isolation but both had had intimate contact with domestic animals and both may prove to be permanent carriers. It is interesting to note that two cultures of *S. montevideo* were each isolated from the gall bladder of an individual during surgical operations, an observation which raises the possibility of types of animal origin localizing in that organ in the same manner as species of human origin.

The most important observation to be made from our 45 months' experience is that 43.3 per cent of all new isolations of *Salmonella* types (including the typhoid organism) were strains of animal origin. In other words, in 155 out of 358 cases of *Salmonella* infection, laboratory work indicated that the search for a human carrier as the original source would be of secondary importance and might prove fruitless. By this fact alone, our results prove the value of *Salmonella* typing as a practical diagnostic and epidemiological aid, particularly since

failure to apply antigenic analysis would undoubtedly have resulted in a false diagnosis of paratyphoid B infection or in an incomplete diagnosis in almost one-half the cases studied. To lend emphasis to this point, a number of cultures classified as paratyphoid B in local laboratories have proved to be *typhimurium, choleraesuis* or even *oranienburg* in our hands and one "typhoid bacillus" proved to be an anaerogenic *typhimurium*. These had all been "confirmed" by agglutination in commercial antisera.

By a study of Table 2 it will be seen that ability to recognize three serotypes (*typhi, schottmuelleri,* and *typhimurium*) would have been sufficient to classify more than 70 per cent of all strains isolated and that the ability to recognize somatic groups B, C, D, and E in addition would have given useful information in 98.9 per cent of cases.

DISCUSSION

Availability of antisera for all known somatic groups of *Salmonellae* has many times enabled us to save much valuable time which would otherwise have been spent in the study of "paracolon" and similar organisms of no proven significance. Many of these are late fermenters of lactose or sucrose so that reporting is considerably speeded up by the early elimination of the possibility of a *Salmonella* type through application of serological methods. Conversely, *Salmonella* antigens have been encountered in coliform and other organisms but always either somatic or flagellar, never both, in a given strain.

Mention has been made of *Salmonella* types isolated from apparently healthy individuals. It has also been pointed out that the carrier state in man is usually transitory for the animal types. This is an important consideration. Let us assume that *S. california,* an organism with somatic antigens similar to *S. schottmuelleri,* is isolated from a healthy man who is being investigated as a possible carrier of paratyphoid B. Simple agglutination tests not based upon antigenic analysis would undoubtedly lead to a false conclusion inasmuch as somatic agglutination would occur in paratyphoid B antiserum. The man would, therefore, be considered a paratyphoid B carrier and mistakenly be adjudged the probable source of the outbreak. Besides creating confusion and leading to false epidemiological conclusions, the laboratory report would subject the man to regulatory restrictions of movement and occupation when the strain isolated may very probably have been a transient visitor acquired by close association with infected barnyard fowl or other animals. In Connecticut, even though repeated negative cultures may be obtained following the declaration of the carrier state for paratyphoid B, the carrier cannot be released until a series of cultures taken *at least one year after discovery of the carrier state* is negative. The application of a similar provision to carriers of animal strains seems unnecessary until the permanency of the carrier state has been established for each individual case. It is unjust if, as in the example given above, it rests upon the rather shaky legal ground of a false diagnosis.

Salmonella typing in the public health laboratory raises problems for the epidemiologist who must eventually enlist the services of veterinary and food control officials in breaking the chain of events which leads from infected or carrier animals to infected man. While transmission of animal strains from man to man should not be overlooked as a possibility, the following more probable means of transmission should be uppermost in the thoughts of the investigator: (1) handling of pets and domestic animals; (2) ingestion of raw or incompletely cooked flesh or eggs; (3) contamina-

tion of foods by the droppings of animals such as rats or mice or by flies and other insects; (4) contamination of prepared foods such as cold cuts, salads, and cheese when handled by persons also engaged in dressing fowl and meats.

It is plain that the laboratory services described here will provide the needed evidence for the institution of regulations for the control of the salmonelloses transmissible from animals to man. The framing of such regulations as are feasible is a matter of coöperative effort on the part of public health and veterinary officials. Veterinary bacteriologists and pathologists have already taken the lead in pointing out the importance to man of the animal salmonelloses, particularly those of fowl. Edwards[7] states: "Several years of work on the *Salmonella* group have disclosed that fowl are the greatest reservoir of paratyphoid infection in the United States." Jungherr[8] observes: "The control of paratyphoid infections in birds must be viewed from two standpoints, that of man and that of animals."

SUMMARY AND CONCLUSIONS

The value of *Salmonella* typing in a public health laboratory is discussed and the methods used in Connecticut are presented. A public health laboratory should render at least a minimum typing service by which human types may be differentiated from animal types and the main somatic groups (B, C, D, and E) may be recognized. The methods involved are no more complicated than those for pneumococcus typing. Additions to or departure from this basic plan may be desirable in a given locality but should be made only after a sufficiently long experience to obtain a general idea of the types commonly encountered. The assistance of a National Salmonella Center should be utilized in any case.

In Connecticut, *Salmonella* typing, originally the minimum stated above, was started in 1939. The results of this service extending over 45 months for a total of 358 cultures have shown: 43.3 per cent of all new *Salmonella* isolations were strains of animal origin, belonging to 23 serotypes; 56.7 per cent were of human origin, represented by 2 serotypes, *S. typhi* and *S. schottmuelleri*. The most common serotypes were as follows: *typhi*, 40.8 per cent; *schottmuelleri*, 15.9 per cent; *typhimurium*, 14.8 per cent. Only 1.1 per cent of the serotypes fell into somatic groups other than B, C, D, and E. Organisms isolated for the first time from man were *S. california*, *S. pullorum*, *S. worthington*, *S. kentucky*, and two new types—*S. hartford* and *S. simsbury*. Concerning the animal strains, the carrier state in man was rarely prolonged either in convalescents or in healthy individuals and the chronic carrier state is by no means so frequently found as with types of human origin.

Typing of a *Salmonella* culture by means of antigenic analysis is the only procedure by which the laboratory can furnish an authentic report and so save time and effort in the ensuing epidemiological investigation by stressing the relative importance in each case of (1) looking for the human carrier or (2) establishing a chain of events leading from the infected or carrier animal to man.

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Isolation of Neisseria flava from the Genitourinary Tract of Three Patients*

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THE cultural method for the diagnosis of gonococcal infection has not only proved to be a useful aid in the diagnosis of the disease, but has demonstrated the presence of *Neisseria* other than the gonococcus in the genitourinary tract.[1] In an epidemiological investigation of gonococcal infection in Glynn County, Ga., during the summer of 1941, *Neisseria flava* was isolated from 3 of 505 patients examined for evidence of gonorrhea. These cases were of interest because all 3 patients presented symptoms similar to those of gonococcal infection, but in no instance was *Neisseria gonorrhoeae* observed in either films or cultures.

The essential information concerning each patient is briefly summarized.

Patient Br.—A 37 year old married colored woman who applied to the Board of Health for a "health card" required for employment as a domestic servant. Gonococcal infection denied. Examination revealed extensive cervical erosions and a moderate purulent discharge. Serologic test for syphilis positive. Films from the cervix revealed no Gram-negative cocci. Predominating organism isolated in culture was *Neisseria flava*.

Patient St.—A 17 year old single colored girl who presented herself at the venereal disease clinic for treatment of a profuse vaginal discharge. Venereal disease denied. Examination revealed slight erosion about the cervical os and a moderate purulent exudate. Films from the cervix showed no Gram-negative cocci, but cultures yielded *Neisseria flava*.

Patient Th.—A 41 year old married white man who came to the clinic for the treatment of a chronic gonococcal urethritis, which failed to respond to sulfonamide therapy. Admitted several previous attacks of gonorrhea. Was under treatment for syphilis at the time of examination. Examination revealed a moderate, creamy-white, urethral exudate, lighter in color than that characteristic of gonoccocal infection. Several large venereal warts were distributed over the dorsal surface of the corona, some of which exuded pus similar to that discharged from the urethra. Microscopic examination of films prepared from the exudate revealed Gram-negative diplococci slightly more spherical in shape than the gonococcus. *Neisseria flava* predominated in cultures; this organism was again isolated 6 days later from the same source.

The patients were treated with sulfathiazole, and subsequent examinations revealed no evidence of either *Neisseria flava* or *Neisseria gonorrhoeae*.

The biologic characteristics of the three strains of *Neisseria flava* were similar. Discrete, opaque, pale yellow colonies, slightly flatter than those of the meningococcus, were formed on chocolate-blood agar. The pigment was barely discernible, except when the organisms were grown on a light-colored medium, such as coagulated blood serum. All three strains of *Neisseria flava* fermented glucose, maltose, and levulose

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

and thus were identified as type ii of Elser and Huntoon, or type iv of Gordon.[2] Microscopically, the cells resembled those of the meningococcus more closely than those of the gonococcus because of their spherical appearance.

DISCUSSION

To our knowledge, this is the first reported instance of the isolation of the type of *Neisseria flava* described herein from the genitourinary tract of man. The recovery of Gram-negative cocci other than the gonococcus from the genitourinary tract has been reported in the literature, but the meager descriptions of the biologic characteristics of the organisms have made identification uncertain. In 1936, Coutts and Barthet[3] reported the recovery of "naso-pharyngeal Gram-negative cocci" from the cervix of two prostitutes. One strain produced pale yellow colonies, failed to ferment any of the carbohydrates, was not agglutinated by an antimeningococcal serum, and was identified as "diplococcus pharyngeus flavus III." The biologic characteristics of the second strain were similar, but production of pigment was not mentioned by the authors. Since the isolation of the three strains of *Neisseria flava* described in this report, Lankford[4] has recovered the organism from semen in two instances.

Neisseria flava is considered to be part of the normal bacterial flora of the upper respiratory tract, and its presence in the genitourinary tract raises some interesting questions as to the source of the organism and its ability to produce disease. There are at least two possible explanations for its presence in the genitourinary tract, one, that it was carried there from the upper respiratory passages, and the other, that unusual environmental factors over a period of time altered the biochemical activities of the gonococcus in such a manner that it acquired additional enzyme systems. Fundamentally, *Neisseria flava* differs from the gonococcus only in the possession of two additional enzyme systems, one of which permits the fermentation of disaccharides and the other the formation of pigment. The absence of gonococci in the 3 cases reported suggests that *Neisseria flava* was responsible for gonorrhea-like symptoms observed.

SUMMARY

Three strains of *Neisseria flava* have been isolated from the genitourinary tract of three patients with clinical symptoms suggestive of gonococcal infection.

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Pyrex Suspensions in Turbidimetric and Colorimetric Determinations

Standards of Comparison for Bacterial Suspensions and in the Resazurin Test

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IT has been difficult in general laboratory practice to prepare reliable standards of comparison for turbidity and turbidity with color, because, while it is possible to establish an adequate color-range with inorganic compounds in acid solution, materials for the simulation of turbidity are neither so readily available nor so satisfactory. In 1939 Brewer and Cook[1] reported that a suspension of Pyrex glass had been found to be markedly superior in the standardization of typhoid vaccine to the suspensions of silica or barium sulfate ordinarily employed as standards of turbidity. Particles of from 0.5 to 3.5 microns in diameter were suspended in distilled water to simulate suspensions of typhoid bacilli; they did not dissolve or aggregate during a 5 year period of storage. The technic of Brewer and Cook has been adapted to the preparation of stable permanent standards of turbidity in the preparation of bacterial suspensions.[2] Pyrex suspensions in colored media have also been used experimentally as color standards in the resazurin test used in the grading of milk.[3] Other possible uses of the suspensions are as standards of comparison for milk of varying natural colors; alpha-naphthoflavone-iodine adsorption compound, a colored suspension that is formed in a test for residual chlorine in water[4]; colloidal complexes of copper or zinc with sodium diethyldithiocarbamate; mixed suspension of silver chloride and silver chromate found at the endpoint of the titration of chloride in water; precipitate of barium sulfate encountered with turbidimetric tests for sulfate or barium. For this latter purpose it would be necessary to modify the procedure of decantation to select the larger particles.

BACTERIAL SUSPENSIONS

The modified technic differs from the original in that it employs a longer period of shaking, by which a suspension may be made to the required density without the tedious process of evaporation, and that standardization is by photoelectric colorimeter instead of by particle counting under the microscope. Variations in particle size are limited by specifying both the turbidity and concentration of the stock suspension. In the experimental studies, series of standards were made for direct visual comparison with various bacterial suspensions — pneumococcus, meningococcus, *Bacterium typhosum*. Turbidity was made equivalent to that of the barium sulfate standards then used[5] and the suspensions were arbitrarily numbered in ascending order as concentration was increased. Each Pyrex standard was prepared in distilled water and in two colored solutions to match the media used for the bacterial suspensions. Without exception, com-

parisons were made more readily with Pyrex suspensions because of their similarity to the sample in color, particle size, and turbidity. Pyrex standards have now replaced barium sulfate standards. The rate of settling is so slow that frequent shaking is unnecessary. Stability during storage is an added advantage.

PREPARATION OF STOCK SUSPENSION OF PYREX GLASS

Break discarded Pyrex glassware into ¾" or smaller chips. Fill a Pyrex bottle, 6¾" in diameter and fitted with a Pyrex glass stopper, to a depth of 2½" with chips. Clean the chips and bottle. Just cover the chips with distilled water and shake for two 6 hour periods in a machine operating at 130 cycles per minute with a 2" stroke which should provide for violent agitation of the chips. Use fresh water for each period of shaking. Again cover the chips with distilled water and shake for the third time until the suspension approximates the opaqueness of skim milk; the time required will vary from 24 to 120 hours (not necessarily consecutive), depending upon whether freshly broken chips are used.

Transfer the suspension to 1 liter cylinders, cover, and let stand for 48 hours to allow the coarser particles (2 microns) to settle. Decant supernate; allow to settle 24 hours and decant again. Determine the turbidity of the decanted suspension in a photoelectric colorimeter, Luximeter (L) or Klett-Summerson (KS). Use test tubes and a blue filter with the latter. Dilute with distilled water if necessary to bring L to 40 or KS to 590. If too dilute, return the suspension to the original bottle containing the glass chips, shake further in the machine, repeat the settling and decantation procedure, dilute to the standard turbidity, and determine the dry-solids content. If less than 0.20 per cent, return the suspension to the cylinders used for the second decantation, mix, and let settle for a shorter period to retain a higher proportion of large particles; if more than 0.25 per cent, use a longer settling period to retain a lower proportion. (The suspension we have actually used is 0.22 per cent. How closely this should be approximated would depend upon the precision required.)

Standards for Bacterial Suspensions

Prepare standards by dilution and calibration in a photoelectric colorimeter as indicated in Table 1. The diluent is distilled water or a colored medium.

Make standards resembling beef-extract or bile-peptone solutions by mixing one volume of diluted stock Pyrex suspension with two volumes of the color solution. Use a dilution of one volume of distilled water with two volumes of color solution for the zero setting of the colorimeter that is used. These suspensions settle slowly and should be mixed after several hours' standing.

Beef-extract broth color solution—Dissolve 1.245 gm. of potassium chloroplatinate (K_2PtCl_6) and 1 gm. of cobalt chloride ($CoCl_2.6H_2O$) in distilled water. Add 100 ml. of concentrated hydrochloric acid and dilute to 1 liter.

Peptone-bile color solution—Dissolve 2 gm. of potassium chloroplatinate (K_2PtCl_6) and 3.75 gm. of copper sulfate ($CuSo_4.5H_2O$) in distilled water. Add 100 ml. of concentrated hydrochloric acid and dilute to 1 liter.

Dispense the suspensions in round-bottomed vials, 15 or 19 mm. outside diameter, marked

TABLE 1

Dilution and Calibration of Pyrex Suspensions

Turbidity Standard	*Approximate Concentration of Stock Suspension*	*Turbidity as Indicated by Photoelectric Colorimeter Scale Readings*	
		Luximeter	*Klett-Summerson*
No.	Per cent	L	KS
0.5	3.32	95	40
1	8.34	89	100
2	18.8	78	210
3	30.0	70	290
4	39.6	63	360
5	52.2	57	420
6	60.5	53	460
7	66.7	50	490

at the initial liquid level (bottom of meniscus), and equipped with moulded screw caps. Since these colored standards are acid, the cap lining must be acid resistant. Examine the suspensions with photoelectric colorimeter at intervals of 6 months, or whenever the level of the liquid becomes lower than the graduation mark on the vial, and adjust the concentration if necessary.

RESAZURIN TEST OF MILK

Successful application of the resazurin test for the grading of raw milk according to sanitary quality is dependent upon reliable standards for color comparison in the range from blue through shades of purple to red, to pink, and to white. It has been found difficult in this laboratory to prepare resazurin-treated milk representing the maximum blue or red upon which Ramsdell based the preparation of his standards.[8] Experience with the Pyrex turbidity standards encouraged the hope that these suspensions might also be used as permanent standards simulating milk. The stock suspension was allowed to settle only long enough to remove the coarsest particles. Inorganic color solutions were added to provide a series with which any of the colors encountered in the test could be matched. These standards, given arbitrary numerical designations, were used satisfactorily in a preliminary study of the resazurin test and the resazurin-rennet test[6] in natural daylight or under artificial reflected light—a fluorescent "daylight" lamp. They were also used in the field for a year and showed no deterioration in careful comparison with freshly prepared standards.

No attempt has been made to correlate with milk-quality the arbitrary numbers assigned to the color standards. Rather, it is hoped that this correlation and also standardization in terms of an accepted color-recording system may be undertaken by investigators who are studying the test. Certainly the utility of the resazurin test will be more readily determined if the standards can be easily prepared in any analytical laboratory. Davis[7] has suggested that the establishment of a color standard be delegated to an international committee.

White Suspension—With distilled water prepare a suspension concentrated to resemble skim milk as described in the preparation of Pyrex standards for bacterial suspensions; allow to settle only 5 minutes to remove the coarsest particles. Adjust the concentration by dilution or further shaking so that 1 ml. in 100 ml. has a Luximeter reading of 83 or 84 or a Klett-Summerson reading of 160 to 150.

Blue Suspension—Prepare a concentrated white Pyrex suspension. Adjust so that 1 ml. in 100 ml. has a Luximeter reading of from

TABLE 2

Preparation of Permanent Standards for the Resazurin Test

Color Range	*Turbidity Standard*	*White Suspension*	*Blue Suspension*	*Red Solution*	*Yellow Solution*
	No.	ml.	ml.	ml.	ml.
	13	1.85	3.00	0.15	0.00
Blue	15	2.84	2.00	0.16	0.00
to	17	3.83	1.00	0.17	0.00
red	19	4.82	0.00	0.18	0.00
to	21	4.87	0.00	0.13	0.00
milk	23	4.93	0.00	0.07	0.00
color	25	4.98	0.00	0.00	0.025

Note: In the Munsell Color Notation[9] the turbidity standards were interpreted as follows: No. 13, [5.0 PB] 7/3; No. 15, [7.5 PB] 7.5/4; No. 17, [P] 8/2; No. 19, [2.5 RP] 8/4; No. 21, [5 RP] 8/4. The delicate gradations from No. 17 could not be indicated with the same exactness as for the lower numbers. It would seem that advantage could be taken of the highly developed Munsell notation if a practical field outfit could be developed, for example, colored strips mounted in test tubes for comparable examination with the treated sample.

80 to 82 or a Klett-Summerson reading of 190 to 170. Dissolve 15 gm. of copper sulfate ($CuSo_4.5H_2O$) in about 75 ml. of the suspension, add 1.6 ml. of concentrated sulfuric acid, and dilute to 100 ml. with more of this suspension. This should have a Luximeter reading in the same range as the white suspension in a 1:100 dilution. The Luximeter should be adjusted to 100 with a distilled water solution of 15 gm. of copper sulfate and 1.6 ml. of sulfuric acid in 100 ml. Adjust the turbidity, if necessary, by preparing suspensions of higher or lower Pyrex content, maintaining the same concentrations of copper sulfate and acid.

Red Solution—Prepare a distilled water solution of 476 gm. of cobalt chloride ($CoCl_2.6H_2O$) and 100 ml. of concentrated hydrochloric acid per liter of solution.

Yellow Solution—Prepare a distilled water solution of 2 gm. of potassium dichromate ($K_2Cr_2O_7$), 38 gm. of cobalt chloride ($CoCl_2.6H_2O$), and 8 ml. of concentrated hydrochloric acid per 100 ml. of solution.

Dispense the standards in vials of 15 mm. outside diameter having screw caps with acid-resistant linings and a graduation mark at the initial liquid level (top of meniscus). Whenever the liquid level is low due to evaporation, make up to volume with distilled water. At intervals of 6 months or at any time when portions of the suspension have become so packed that they cannot be resuspended, discard and replace with freshly prepared standards.

SUMMARY

Methods are given for the preparation of Pyrex glass suspensions as standards of turbidity.

Pyrex suspensions in colored media have been substituted for suspensions of barium sulfate in the standardization of bacterial suspensions and have been employed experimentally in the resazurin and resazurin-rennet tests for the grading of milk. The glass suspensions closely resemble bacterial suspensions in appearance, settle slowly, and remain stable longer than those of barium sulfate. In the resazurin test, Pyrex suspensions in colored media have the advantage of being directly reproducible from readily available materials. Standardization in terms of an accepted color-recording system and in relation to milk-quality is suggested.

Pyrex standards have been found to be stable for at least one year.

Various uses for Pyrex suspensions are suggested.

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The Single Line Index as an Administrative Aid*

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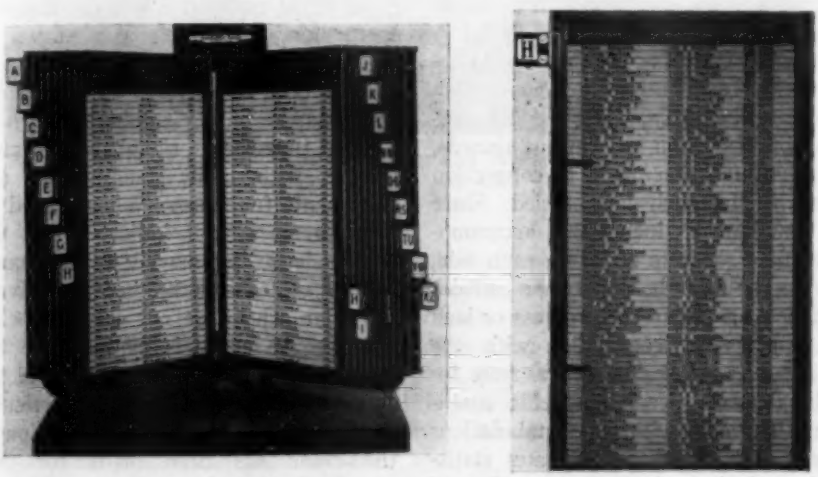
STAFF depletion due to the demands of military services requires that the remaining health department personnel train and utilize lay assistants to the fullest extent, thus relieving professional public health workers of minor tasks. Similarly, clerical procedures may be overhauled profitably and devices adopted to conserve further the time of the administrator and field worker. Such a device, namely, the single line visible index, is particularly helpful. Arranged in panel form with a guide strip giving the headings for the entries on the separate index strips and utilizing strips and signals of different colors, it is possible to envision at a glance the significant details of each individual case as well as the over-all status of the particular public health activity for which it is used. Since the device is a visual aid, it may be likened administratively to the spot map of the epidemiologist.



Courtesy of Remington Rand, Buffalo; and Acme Visible Records, Inc., Chicago

FIGURE 1—Desk stand and a single panel.

Single line visible index panels (Figure I) have been in use for many

* Presented before the Health Officers Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

years to provide quick reference for lists of names or cases but only in isolated instances has their use been extended. Such an extension was developed in 1938 at Vanderbilt University to provide a simple method of promptly determining patient attendance and delinquency at syphilis clinics.[1] Impressed by the possibilities of the device, our department proceeded to experiment with it. The first application was in connection with venereal disease clinic data, the panel system now in use representing an amplification of that installed by the Vanderbilt clinic. This proved so useful, the same principle was applied to tuberculosis contact examinations, the inspection and follow-up of violations of pasteurizing plants, case visitation by public health nurses, etc.

It should be emphasized that single line index panels present no new information. Their value lies in bringing together in visual form on a strip ¼ inch wide by 6 inches long selected information obtained from the various records, inclusive of action taken in connection therewith, for each case carried. Since the standard 15 inch panel accommodates fifty separate strips on each side, the worker and the supervisor can determine at a glance the progress or lack of progress in connection with the project as a whole, as well as note individual cases needing specific attention. The ease with which tabulations may be made greatly facilitates statistical analysis and the preparation of reports, thus resulting in a saving of time and labor if previous methods of obtaining the same information are taken into consideration.

Decision to make use of single line visible index panels for a particular public health activity depends on the administrator's need for such a tool. While the principle involved may be applied to a variety of public health activities, the purpose to be achieved must be given careful thought. In designing a panel system, only a minimum number of items should be included and these should be selected carefully to assure adequate evaluation of the project as a whole, as well as of its component parts.

To show how single line visible index panels have been developed by our department for local use, several examples are illustrated in the charts accompanying this article.

USE AS A ROSTER OF TUBERCULOSIS CONTACTS AND EXAMINATION APPOINTMENTS

The panels consist of single line strips arranged by nursing districts, with the cases (blue strips) in alphabetical order, each case being followed by its contacts (buff strips). Two guide strips (salmon color) are inserted at the top of each panel as shown in Figure 2 which is a reproduction of a portion of a tuberculosis roster panel now in use. The first guide shows how a green transparent signal used in connection with clinic examination appointments functions. When placed at the extreme left, it indicates that the case is dead; has moved; is in a sanatorium; or is under the care of a private physician who does not wish the case visited. An entry is made above the surname to indicate the reason. If the signal is placed under a particular month, appointment for examination at the clinic has been made for that month during the current year. If placed under the column headed "Delinquent," the patient failed to keep the appointment and is delinquent. When placed at the extreme right, an appointment has been scheduled for a future year and the appropriate penciled entry is made after erasing any previous notation in this column. At the first of the new year, signals are moved to the proper month position for the then current year. The absence of the green

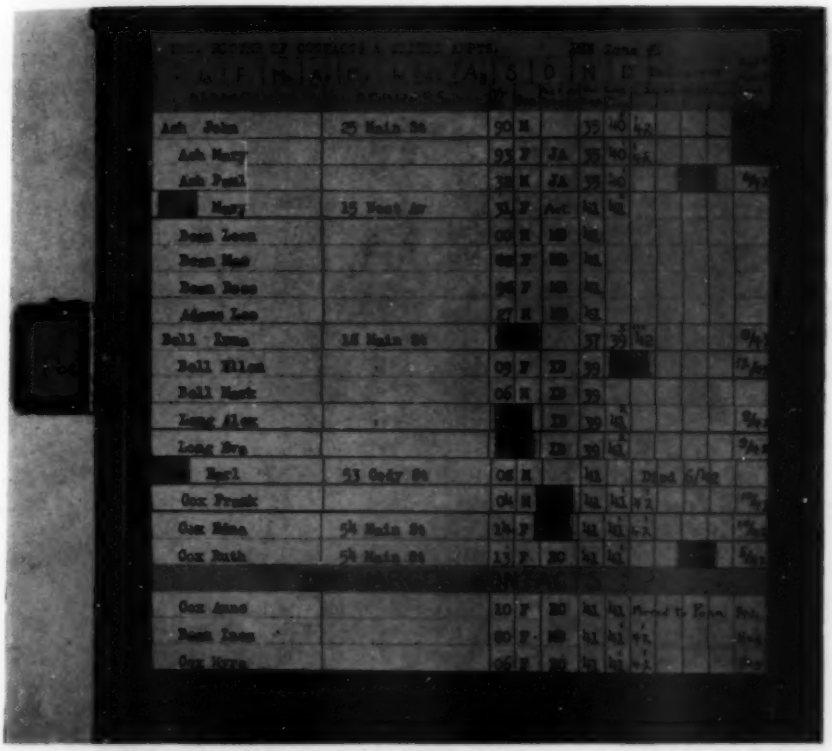


FIGURE 2—Panel as tuberculosis contact roster and follow-up on clinic appointments. Cases on blue strips; contacts on buff. As color could not be photographed, contacts are indented.

signal on a strip indicates that no appointment for examination has been scheduled.

The second guide strip at the top of the panel gives the headings for the entries to be made on the index strips, most of which are self-explanatory. It has been our practice to post the address of the case but to omit posting the address of the contacts unless different from that of the case. The item "color" is omitted in areas where it is not a factor. Under the heading "Act. or Source," the entry on the case strip indicates the degree of infectivity of the case and is posted in code; whereas for the contact strip, the initials of the source case are used. If a case has no contacts, the entry "O" is also posted in this space. Under the column headed "Yr. Rep.," entry of the year reported is posted for cases; whereas for contacts, the year added to the record is used. Examinations prior to the installation of the panels are noted by posting the year of the last known examination under the heading "Last Yr. Exam." with an entry directly above this figure to indicate the total number of previous examinations. Subsequent examinations are shown by entering the year in one of the four columns provided for this purpose. A tally mark is placed above this entry to show the number of examinations made during the specific year. Advance appointment dates are entered in the last column of the strip. It has been our practice to make all entries in pencil for items subject to

change. To care for contacts discharged from supervision, the contact strips with notation of the reason for discharge are placed at the bottom of the panel to await tabulation before being destroyed. If a contact is found to be a case, the contact strip is moved to the discharged section of the panel and a case strip is inserted in the active section. An entirely separate panel or section thereof, not shown in Figure 2, with strips of a third color is used for clinic registrants who are neither cases nor contacts.

With the foregoing explanation in mind and a reasonable amount of prac-

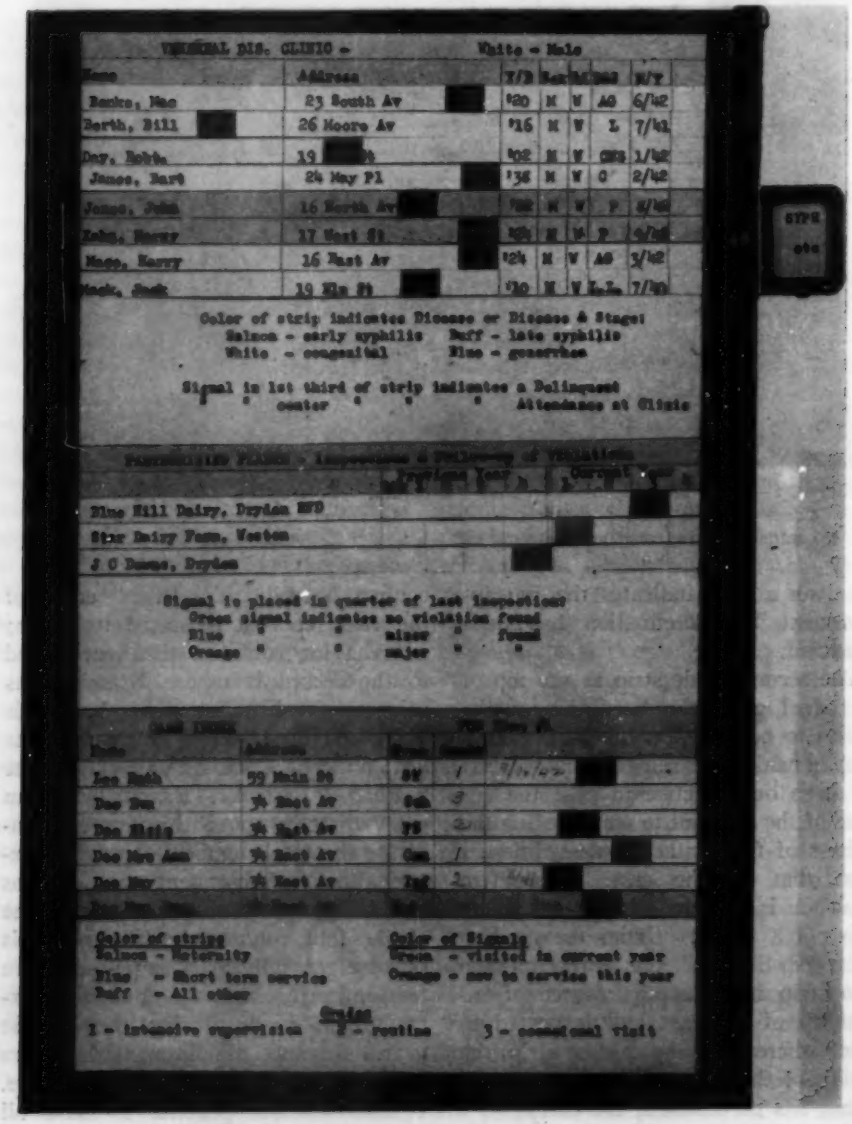


FIGURE 3—Other uses of panel as clinic record or guide for inspections and visits.

tice, it is possible to review the panels quickly for significant factors, and to sum up as to the adequacy of control activities in a particular area. Contacts never examined as well as those examined excessively stand out boldly. Failure to have contacts adequately examined where exposed to a case with positive sputum as well as the need to separate such case from its contacts is immediately evident. Similarly, examination of a disproportionately large number of contacts from the youngest age group (0–14 years) can be demonstrated and attention called to the need for adult contact examinations where efforts may be spent more profitably. Cases lacking an entry as to the activity of the infection and therefore the degree of infectivity, signal a need for a review of such cases with the tuberculosis clinician. Contacts delinquent for examination, if occurring in appreciable numbers indicate the need of further study and possibly nurse instruction in the technic of scheduling appointments or perhaps the formation of night clinics in areas where delinquency is confined chiefly to adult males.

Tabulations may be made quickly by sex and age groups of contacts previously examined, those examined during the current year and those examined for the first time during the current year. Other possible summaries include contacts discharged with reasons therefor, contacts added during a current year and number examined, contacts of cases reported in the current year and number examined and number of cases for which contacts are unknown. Such tabulations will aid the administrator in assuring a vigorous program for the eradication of tuberculosis.

USE AS A CLINIC RECORD OR GUIDE FOR INSPECTIONS AND VISITS

Simple but useful employment of index panels to visualize pertinent data relative to the clinic attendance of venereal disease cases, the supervision of pasteurizing plants and the visitation of cases by nurses is shown in Figure 3. Limitation of space permits reproduction of only a portion of such panels; therefore, the explanatory information at the bottom of the charts is confined to the material shown and does not cover obvious omissions concerning other contingencies. The purpose of displaying additional examples is to suggest possible ways in which single line visible index panels may be profitably utilized, leaving it to the ingenuity of the individual to develop a system of guide strips and colored signals to satisfy particular needs.

SUMMARY

The use of single line visible index panels permits the worker and supervisor to evaluate at a glance the status of the particular public health activity for which it is used as well as to note individual cases needing specific attention. Since the device is a visual aid, it may be likened administratively to the spot map of the epidemiologist.

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Ways to Community Health Education*

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THE field of health education is so wide in its scope, and its activities are so multiple and complex, that it is impossible for a single method or a standard procedure to be useful in all the cases and circumstances; consequently, the ways to health education are many, and extremely varied.

In the present chart I have endeavored to classify schematically the ways which a health educator—either a health officer, a nurse, or a social worker—should have in mind to carry on his duties in the field, or in the classroom.

I think that Health Education, in general, comprehends two great groups of activities: Health Propaganda and Health Instruction. The first one includes both Health Information to individuals and Health Publicity to a community as a whole. Health instruction is concerned with school and college health education and with the training of professional personnel; i.e., physicians, engineers, dentists, midwives, inspectors, nurses, and teachers. The technic of both health propaganda and health instruction can be comprehended in two main items:

A. ACTUAL PRESENTATION OF TOPICS

In this item are included all the ways and means through which a topic or theme is actually presented or exhibited to any audience. The topic in question can be presented in two different ways: (a) By display of objective materials, as in an exhibition of a definite sort of materials in windows or cases, e.g., clothes for maternal and child hygiene use; different kinds of diets for nutrition, and dietetic suggestions; or (b) by demonstration, as to the correct use of a toothbrush in mouth hygiene; the methods of preparation and cooking of foods before a mother's club; training of health officers and nurses in health districts, etc.

B. DESCRIPTION OR REPRESENTATION OF THE THEME

The theme or topic is represented in a manner designed best to attract and sustain the attention of the public. This aim or objective can be attained by auditive, visual, or audio-visual aids, or by other miscellaneous devices:

AUDITIVE AIDS

Among the auditive aids the spoken word sometimes may be coördinated with music and poetry, because the rhythm of a poem and the melodies of music are two excellent ways to carry any message to an individual, to an audience, or to the general public.

Oral propaganda, as well as instruction, can be delivered in two ways:

1. *Direct*, as when the educator—public health worker or teacher—speaks face to face, directly to a definite, particular, individual or group of persons; in this way, a person's word can be

* Presented at a Joint Session of the American School Health Association and the Public Health Education and Public Health Nursing Sections of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

delivered in the most favorable conditions both for the educator and for the audience: the speaker is able to explain and to illustrate the theme as extensively as it is pertinent to do so; he is in position to strengthen his arguments or to appeal vigorously to his listeners when doubt arises among them, or when boredom or indifference is shown by the attendants; he has the opportunity to adapt the substance and manner of presentation to the intellectual level of the audience.

2. *Indirect.* When the educator talks to an invisible person or crowd, as through a microphone, telephone, or phonograph record, he is following an indirect method of propaganda and instruction; under these circumstances, any talk or address must be short and clear; laconic, if necessary; energetic, penetrating, more appealing and more suggestive than documentary.

Direct instruction and propaganda can be *indoors* and *outdoors;* it is very important that the educator have in mind this fact, because there is a great difference in the kind of attention paid and the interest taken by the audience when it is addressed in a comfortable, well located place, seated in easy chairs, and when given outdoors, standing in a square or in a parade ground.

VISUAL AIDS

Visual aids to health education are essentially the printed word, pictorial procedure, and models.

1. The printed word, as used in health education, is delivered to individuals or to the public in the form of letters, booklets, leaflets, folders, magazines, journals, books, etc.

Printed material may be delivered to determined groups of persons or addressed to names taken from directories or selected mailing lists: this excellent way of distributing propaganda is called *personal* or direct.

It is entirely different when materials are delivered to a *general* public or distributed to a promiscuous crowd.

When printed material is distributed to the general public without any discrimination whatsoever, it is done with the hope that a large number of persons have time and willingness to make good personal profit of it; for this purpose fliers, leaflets, folders, and newspapers are distributed, and many other materials destinated to be read.

Another way to use printed material as an educational tool is when it is exhibited to the public in places in which there are chances for it to be seen; this kind of propaganda must be extremely brief; very attractive and appealing; showing the topic at a glance, in such a manner that "he who runs may read." This is the way and kind of propaganda to be glanced at.

Materials to be glanced at may be exposed in an intramural environment in the form of posters placed in waiting rooms, inside vehicles, etc., or in extramural places.

The extramural propaganda sometimes can be ambulatory, as that conveyed by men in streets, or outside of buses or trucks; but more commonly it is used in fixed form.

The materials fixed in places in which they are easily destroyed are called transitory, while those more or less enduring constitute a permanent propaganda, like electrical signs, frescoes painted on a wall, posters along a highway, stone signs on the top side of a hill, etc.

2. Pictorial propaganda is based upon pictures or drawings which may represent things or living beings, or may be graphics of deeds and events.

Pictures of things or living beings may be representative of the topic, as a photograph or sketch of a privy in the educational material used with sanitation purposes; it may be purely decorative, as are landscapes; it may be symbolic or allegorical, as the picture of

a monster representing an illness; it may be suggestive, e.g., the well known dog listening and recognizing "his master's voice," which suggests to the public the high fidelity of sounds in certain phonograph records.

Deeds and events may be represented by pictorial statistics, or by a descriptive or narrative series of pictures, as in graphical stories, film strips, and silent movies.

3. There are many instances when things can be very attractively shown in three dimensions: models, lay figures, statuettes, and even monuments or memorials serve for this purpose.

AUDIO-VISUAL AIDS

On using audio-visual aids as a way to health education, both senses, sight and hearing, are employed as happens when attending a demonstration or a show by puppets or artists. One of the most useful popular and economical forms of health education is talking pictures. For rural health education silent moving pictures are better, provided they are explained personally in plain and easy language by health educators.

MISCELLANEOUS DEVICES

In the item marked miscellaneous devices I include those many and varied "tricks of the trade" like emblems or symbols; dainties for the children; diplomas or other rewards for the winners in health contests; and many other gadgets we are obliged to use in our health educational work, to call the attention, to sustain the interest, to stimulate into action either a person or a group; in short, to attain our goal, i.e., the health and happiness of our people, of all our brethren of the Americas.

WAYS TO COMMUNITY HEALTH EDUCATION

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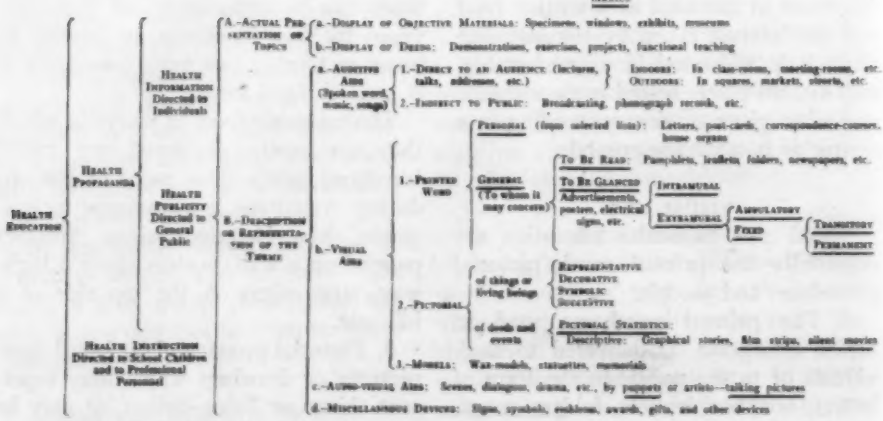
Health Education
Health Propaganda
Health Instruction Directed to School Children and to Professional Personnel
Health Information Directed to Individuals
Health Publicity Directed to General Public
A.–Actual Presentation of Topics
a.–Display of Objective Materials: Specimens, windows, exhibits, museums
b.–Display of Deeds: Demonstrations, exercises, projects, functional teaching
B.–Description or Representation of the Theme
a.–Auditive Aids (Spoken word, music, songs)
1.–Direct to an Audience (lectures, talks, addresses, etc.)
Indoors: In class-rooms, meeting-rooms, etc.
Outdoors: In squares, markets, streets, etc.
2.–Indirect to Public: Broadcasting, phonograph records, etc.
b.–Visual Aids
1.–Printed Word
Personal (from selected lists): Letters, post-cards, correspondence-courses, house organs
General (To whom it may concern)
To Be Read: Pamphlets, leaflets, folders, newspapers, etc.
To Be Glanced: Advertisements, posters, electrical signs, etc.
Intramural
Extramural
Ambulatory
Fixed
Transitory
Permanent
2.–Pictorial
of things or living beings
Representative
Decorative
Symbolic
Suggestive
of deeds and events
Pictorial Statistics
Descriptive: Graphical stories, film strips, silent movies
3.–Models: War-models, statuettes, memorials
c.–Audio-visual Aids: Scenes, dialogues, drama, etc., by puppets or artists—talking pictures
d.–Miscellaneous Devices: Signs, symbols, emblems, awards, gifts, and other devices

Methods of Transmitting Material to a Laboratory for Gonococcus Cultural Studies*

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A PREVIOUS report [1] on the results of 123 controlled experiments described a method for sending material through the mail for gonococcus cultural studies. One hundred and sixteen additional experiments with slight modifications in technic have since been completed. The technic now used is as follows:

Mix equal amounts of sterile distilled water and defibrinated horse blood. Then add, of 1 per cent aqueous solution of crystal violet, sufficient to make a dilution of 1:30,000. Autoclaving is not necessary, since a 1 per cent solution of crystal violet is likely to remain free from growth. Five mg. of para-amino-benzoic acid are then added to every 100 ml. of the blood-dye solution. Test tubes 6 x 50 mm. are used with cork stoppers to fit (No. 000XXX). Autoclave the tubes which are to contain the blood-dye solution at 15 lb. for 20 minutes. Use a 100 ml. burette to fill tubes approximately two-thirds full (0.6 ml.) with the blood-dye solution. Plug with cork stoppers which have been previously dipped in melted paraffin and kept under 70 per cent alcohol. Invert tubes and seal stoppers with hot paraffin. A similar number of tubes is used for keeping swabs sterile. Dip cork stoppers in melted paraffin. Cut round toothpicks in half, make swabs at cut ends of toothpicks, and insert pointed ends into stoppers. Place swabs attached to stoppers in test tubes and autoclave at 15 lb. for 20 minutes. Invert tubes and seal stoppers with hot paraffin.

Some difficulty has been caused by the fact that different lots of crystal violet vary in their bactericidal and bacteriostatic properties. The dye used in our experiments was obtained from the National Aniline and Chemical Company, and the lots with an approximate 84 per cent dye content gave the best results in dilutions of 1:30,000. Each new lot of dye is tested by the following method: Swabs of known positive exudates are put into tubes which contain various dye dilutions in the horse blood and water solution. The tubes are kept at room temperature for 24, 48, and 72 hour intervals, after which the swabs are planted on chocolate agar plates which are incubated for 48 hours. The dye dilution that causes the greatest inhibition of streptococci and staphylococci and at the same time permits the gonococci to remain viable is selected for use.

Another difficulty is the technic of obtaining specimens. In the case of

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

females we have had our best results when the cervical canal has been wiped clean with sterile cotton and the fresh material from the deep cervical glands has been utilized. When this method was not followed there were frequently more extraneous microörganisms than couid be inhibited by the 1:30,000 crystal violet.

Results with 116 exudates are shown in Table 1.

TABLE 1

116 Delayed Cultures of Exudates

(All Control Cultures Positive for Gonococci)

Hours Delayed	24	48	72	...
Number of Cultures	45	51	20	116
Number Negative	2	5	2	9
Number Positive	43	46	18	107
Percentage Positive				92

In the previously reported experiments gonococci were detected by culture in 115 of the 123 exudates that had been in the blood-dye solution from 13 to 72 hours before planting. These and the 116 additional experiments now completed give a total of 239 controlled experiments in which gonococci were detected in 222 plates that were not planted until the exudate had been in the blood-dye solution from 13 to 72 hours, or an efficiency of 93 per cent.

Allison, Charles, and Carpenter [2] have reported their experiments on the survival time of gonococci in urine in male patients. They worked with uncentrifuged urines and urine sediments. Some of each were kept at 4° C. and at room temperature from 1 to 48 hours before planting. The authors report the survival of 100 per cent of 86 strains up to 3 hours, 84 per cent at 12 hours, 41 per cent at 24 hours, and 2 per cent at 48 hours. When, however, urine specimens were centrifuged and the supernate discarded, gonococci were recovered from 88 per cent of the 17 sediments that had been kept at 4° C. for 24 hours. The authors reported that the pH of the urine had little if any influence on the results.

Recently we have experimented with delayed cultures of urine specimens. The following technic has been used for collecting these specimens. A patient with a urethral discharge voids into a wide-mouthed sterile receptacle. If no discharge is present the prostate and urethra are stripped and the prepuce is retracted before the patient voids. The glans penis is not cleansed. Into several tubes, each of which contains 1 ml. of defibrinated horse blood, water, and different dilutions of crystal violet, is poured 1 ml. of the urine.

Preliminary studies carried out from June 5 to June 15 revealed that when the urine was combined with the blood-dye solution in strengths greater than 1:120,000 the gonococci were inhibited, but in dye dilutions of 1:120,000 to 1:600,000 the results were sufficiently encouraging to warrant further investigation.

From June 16 to August 1, 320 urine specimens, all of which contained gonococci, were mixed with equal parts of a solution consisting of two-thirds defibrinated horse blood and one-third water. Five mg. of para-aminobenzoic acid were then added to every 100 ml. of the resulting solution. Varying amounts of crystal violet were then added to make, when diluted with the urine, dye dilutions of 1:120,000 to 1:600,000. The tubes are kept at room temperature for 24, 48, 72, or 96 hours, at which times they are centrifuged and the supernate discarded. The sediment is then shaken onto both chocolate agar and starch agar plates which are streaked with a platinum loop. Controls consist of 1 ml. of the same urine specimen which is centrifuged, supernate discarded, and the sediment planted immediately. All plates are incubated under an increased CO_2 tension. Lighted candles in museum

jars are used for this purpose. Plates are read after 48 hours' incubation and suspicious colonies are examined by Gram-stained smears and fermentation tests.

Our results with urines are shown in Table 2. We found that the pH of the urine had no effect upon the results.

Exudates sent to us through the mail in the blood-dye solution were planted in our laboratory. In one instance the delayed culture was negative and the smear was reported positive, and 26 of the delayed cultures were positive when the smears were reported negative. In other words, gonococcal infection that would otherwise have been missed was

TABLE 2

Results of 320 Delayed Urine Cultures

(All Control Cultures Positive for Gonococci)

G. V. Dilution	*1–120,000*					*1–180,000*					*1–240,000*				
Hours Delayed	24	48	72	96	..	24	48	72	96	..	24	48	72	96	..
Number of Cultures	23	12	13	19	67	22	9	14	12	57	20	11	10	8	49
Number Negative	3	3	2	5	13	4	1	5	3	13	1	2	3	2	8
Number Positive	20	9	11	14	54	18	8	9	9	44	19	9	7	6	41
Percentage Positive					80					77					84

G. V. Dilution	*1–360,000*					*1–480,000*					*1–600,000*				
Hours Delayed	24	48	72	96	..	24	48	72	96	..	24	48	72	96	..
Number of Cultures	22	9	10	6	47	24	13	10	7	54	18	10	9	9	46
Number Negative	2	4	3	3	12	4	3	4	4	15	6	2	2	5	15
Number Positive	20	5	7	3	35	20	10	6	3	39	12	8	7	4	31
Percentage Positive					74					72					67

Summary

No. Planted at 24 Hrs. (Exclusive of 1:600,000 dilution)		111	Positive	97	(87%)
" " " 48 "	"	54	"	41	(76%)
" " " 72 "	"	57	"	40	(70%)
" " " 96 "	"	52	"	35	(67%)
Total	"	274	"	213	(78%)

Not included in the above, but possibly worthy of mention, were 56 urines and exudates from patients with active gonorrhea, in which all delayed cultures were positive and 3 routine cultures of exudates and 12 routine urine cultures were negative. Routine cultures were planted within 1 hour after obtaining the material from the patient. During the interval exudates were kept in proteose No. 3 peptone broth.

Routine physical examinations of 367 women inmates of a state institution included cervical smears and cultures. found by the blood-dye technic in 7 per cent of 367 women inmates.

In a series of exudates from 36 patients, sent to us in the blood-dye solution from a venereal disease clinic located in another city, 6 (16 per cent) of the patients with negative smears were found to be positive by culture.

SUMMARY

We feel that the blood-dye method for transmitting exudates through the mail for gonococcus cultural studies is more efficient than the smear method

in detecting such organisms in women, and in men with chronic or latent infections. We do not at this time recommend the sending of urine specimens through the mail for gonococcus cultural studies as a routine procedure. However, our experiments with this method justify further study.

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Accidents in the United States

"It is discouraging to observe that at least as many persons died from injuries sustained in accidents every month in 1942 in the United States as there were civilians mortally wounded by enemy air raids on Great Britain in any one month of the war so far. As a matter of fact, in several months our accident toll exceeded by 1,000 deaths or more the 6,955 British air raid fatalities suffered in September, 1940, when they were at a peak figure." *Statistical Bull.*, Metropolitan Life Insurance Company, December, 1942.

Action of Finely Divided Magnesium upon the Lungs*

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THE recent papers of McCord, Prendergast, Meek, and Harrold,[1, 2] and of Schultz and Walter[3] have focused the attention of American industrial hygienists upon the hazards from metallic magnesium. Their experiments and the observations of several foreign experimenters and clinicians have demonstrated that small particles of this metal embedded in living tissues dissolve with the evolution of hydrogen and the production of an irritating alkaline hydroxide. The tissue response consists of a transitory, acute inflammation which is unique because of the presence of large vacuoles produced by the presence of the gas. When all the metal has dissolved, the inflammation subsides and healing ensues. The amount of residual scar tissue is proportional to the severity of the injury which in turn depends upon the quantity of metallic irritant.

These observations led to the suspicion that dust created in manufacturing and machining magnesium and magnesium alloys might be injurious to the lungs. Inquiry revealed that such hazard could hardly exist in the manufacture of powdered magnesium because the danger of fire and explosion precludes exposure of workmen to appreciable atmospheric concentration of this mineral. In processing these metals, it was found that many of the operations are not productive of much fine dust. When particles small enough to be inhaled are produced it seems highly improbable that the result observed in the subcutaneous tissue could be duplicated in the lungs. The finest dust would theoretically dissolve on contact with water vapor in the nose, trachea, and large bronchi, liberating hydrogen at points where it could be readily exhaled. Undissolved particles that might reach the terminal air spaces would again exert their specific effects where no pressure could develop. Permanent injury to the pulmonary framework could only result from undissolved magnesium particles which might finally be transported into its structure.

The validity of this reasoning has been tested in a series of experiments upon animals. Actual inhalation of magnesium in the form of dry dust has not been feasible, owing to the danger of explosion, but the same objective could be attained by introducing salt solution suspensions of fine magnesium particles through a tracheal tube. Before making such tests, the capacity of the particular material to produce "gas tumors" was tested by subcutaneous injections.

Procedure—The powdered magnesium used had been ball-milled to pass a 200 mesh screen. The particle size ranged between 1 and 100 microns, the average

* Presented before the Industrial Hygiene Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 29, 1942.

being about 30 to 40 μ, with a moderate amount under 4 μ. Two, 5 and 10 per cent suspensions of this material in 0.85 per cent NaCl solution were prepared immediately before injection. Sterilization was omitted because of the rapidity of solution in a fluid medium. The guinea pigs of the first two groups received injections of approximately 0.5 ml. each; for the cats of group C, the dose was 2 to 3 ml. However, these dosages could not be gauged accurately because of the marked tendency of the larger particles to settle out in a syringe.

Group A—Six guinea pigs injected subcutaneously in the groin; dose approximately 10 mg., killed at intervals of 1, 2, 3, 4, 7, and 21 days.

Group B—Ten guinea pigs injected into the lungs by means of a long flexible needle passed through the larynx and trachea into a stem bronchus without anesthesia; approximate dose, 10 mg. One animal died of pneumonia on the 9th day; the others were sacrificed at the following intervals after injection: 24 and 48 hours, 1, 2, 4, 12, and 16 weeks.

Group C—Five cats injected similarly by tracheal catheter through a small bronochoscope; approximate dosage ranged 100 to 250 mg. One of them received 1.5 ml. of a 10 per cent suspension and was killed 1 hour later; the other 4 were given about 2 or 3 ml. of a 5 per cent suspension. These last were killed after 48 hours, 6, 8, and 10 weeks.

None of the animals showed any symptoms after the injection, and as noted there was only one death from pneumonia, which occurred 9 days after intratracheal injection. The tissues of all of them were preserved and examined microscopically.

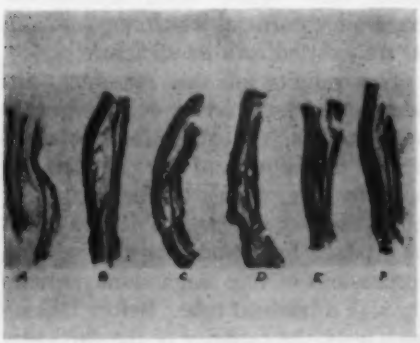

FIGURE 1—Reaction in subcutaneous tissue to 10 mg. of magnesium powder at the following intervals after injection: A, 1 day; B, 2 days; C, 3 days; D, 4 days; E, 7 days; F, 21 days. Gas bubbles in A through D. Some chronic inflammation in E. Tissue practically normal in F.

FIGURE 2—Reaction in lungs 24 hours after intratracheal injection of 10 mg., magnesium powder. Note areas of pneumonia in the lobes on the upper and lower right.

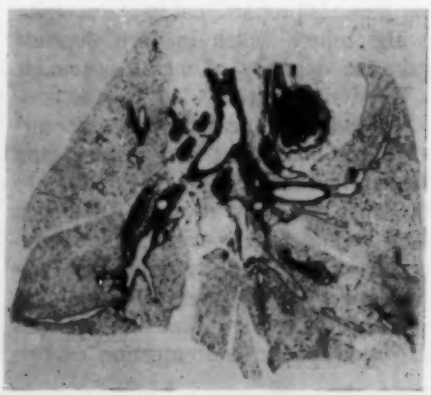

FIGURE 3—All trace of pneumonic reaction has disappeared 4 weeks after injection of 10 mg. of magnesium powder.

Group A guinea pigs demonstrated that this material would produce the typical emphysematous reaction reported by the previous observers. Twenty-four hours after injection, large gas blebs surrounded by acute inflammatory reaction had developed in the subcutaneous tissue. These changes persisted for 3 days. By the 4th day, the blebs were barely visible and healing had begun, as evidenced by proliferation of fibroblasts at the margins of the lesion. At the end of a week, only granulation tissue marked the site of injection and by the 3rd week, practically all traces of reaction had disappeared.

Group B—Guinea pigs in which the same quantity of magnesium was injected directly into the pulmonary air spaces showed comparatively little reaction. In areas where the suspension of particles had lodged, pneumonic reaction developed which persisted in acute form for about a week. Much of this effect was nonspecific in character and was obviously due to the fluid. In extent and severity, it was no greater than many reactions excited by suspensions of more inert particles. The unique feature in these experiments was the early appearance of microscopic vacuoles within the cytoplasm of mononuclear cells projecting from the inner surfaces of the air space walls. Likewise, many of the free wandering phagocytes were fragmented and some showed cytoplasmic vacuoles. Such changes were well defined during the first 2 days but had disappeared by the 7th day. At the latter interval, there was still some evidence of more chronic inflammatory tissue changes, but thereafter the healing and absorption of such elements was progressive. By the 4th month little remained except microscopic thickening of the airspace walls. An exception was noted in one animal, killed 2 weeks after injection, which showed an isolated pulmonary abscess of microscopic dimensions. This lesion was surrounded by granulation tissue; at the edge of its necrotic center there were still vacuolated mononuclear phagocytes and small giant cells. Minute particles that were presumably magnesium were visible for 1 week; thereafter none could be found.

Group C—The 5 cats in this series showed less reaction of a character similar to that in the guinea pigs. Forty-eight hours after injection vacuoles were prominent in both sessile and free phagocytic cells. Small giant cells had formed about the larger metallic particles, and where the latter had dissolved vacuoles were left. By the 6th week, healing was practically complete, and at the 8th and 10th week nothing remained to mark the site of injury.

COMMENTS

The experimental procedure might be criticised on the grounds that all of the particles of magnesium were not of inhalable dimensions and that they were not sterilized before injection. However, the work of the previous authors cited had amply demonstrated the nature of specificity of the magnesium reaction, and our subcutaneous injections in group A guinea pigs indicated that it was being reproduced. The results in this group also proved that the dosage and particle size were adequate to cause characteristic changes in the subcutaneous tissues. When essentially the same, or in the case of the cats 10 to 25 times this amount of magnesium was introduced into the air spaces of the lung tissue, reaction was much less severe. The alkaline hydroxide was irritating, as manifested by localized patches of pneumonia, but as soon as the soluble irritant had been diluted and removed, inflammation subsided and healed. The specific effects of hydrogen gas were manifested in isolated cells which, because of the peculiar anatomy of the lungs, could be blown to pieces without exerting significant pressures upon surrounding tissues. While the involved

phagocytic cells were killed, thereby adding a further source of irritation, the fact that healing with resolution had occurred within 6 weeks demonstrates the comparative innocuousness of the process. Evidence of injury to the fixed tissues of the pulmonary framework is lacking so that one must conclude that very few particles reached such structures.

Since the reaction to a very large number of magnesium particles introduced into the lungs without trauma in a unit time is so slight and transitory, it is hard to imagine much effect from the smaller number of particles that might reach the pulmonary air spaces by inhalation. Presumably the phagocytes would be destroyed as fast as they ingested particles of the mineral, but others are always available to take their place. The concentration of irritant, both from the metallic particles and the injured phagocytes, would probably be too low to cause much inflammation. The possibility of disabling fibrosis from irritation of fixed tissues is very remote.

CONCLUSION

Finely divided metallic magnesium does not have the same effect upon the lungs that it exerts in the more dense subcutaneous tissues. The absence of "gaseous tumor" formation is explained by the free communication of the pulmonary air spaces with the external air. Even if manufacturing processes permitted inhalation of an appreciable amount of magnesium dust, it is highly improbable that serious injury of the lungs will ensue.

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ACKNOWLEDGMENT is due the American Magnesium Corporation for advice on conditions of manufacture and exposure of workmen and for a supply of powdered magnesium.

Milk-borne Outbreaks Due to Serologically Typed Hemolytic Streptococci*

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IN the twenty-five year period, 1917–1941, a total of 168 outbreaks of milk-borne disease have been investigated by the New York State Department of Health. A milk-borne outbreak is defined as one demonstrated to have been transmitted by a common milk supply and to have affected persons residing in more than one household. Ten thousand residents of the state, exclusive of New York City, were affected in these epidemics, the smallest involving 3 persons and the largest an estimated 1,100 individuals.

All the 168 outbreaks were traced to the use of raw milk except two of typhoid fever, one of bacillary dysentery, and one of scarlet fever. The typhoid fever and bacillary dysentery outbreaks were due to pasteurized milk contaminated after processing, and the scarlet fever outbreak resulted from milk labeled "pasteurized" although evidence indicated that it had not been properly processed.

TABLE 1

Milk-borne Outbreaks, New York State (Exclusive of New York City)

1917–1941

Disease	Outbreaks		Cases	
	Number	Per cent of Total	Number	Per cent of Total
Typhoid and Paratyphoid Fever	76	45.2	1,209	12.1
Septic Sore Throat and Scarlet Fever	57	34.0	6,812	68.2
"Gastroenteritis"	24	14.3	1,423	14.2
Bacillary Dysentery	5	3.0	411	4.1
Diphtheria	5	3.0	123	1.2
Poliomyelitis	1	0.6	11	0.1
Total	168	100.0	9,989	100.0

Table 1 presents the distribution of outbreaks according to the type of milk-borne disease and the number of cases resulting. Although typhoid fever and paratyphoid fever have caused the largest number of outbreaks, 45.2 per cent of the total, only 12.1 per cent of the cases have been due to these diseases. Septic sore throat and scarlet fever outbreaks, comprising 34.0 per cent of those studied, contributed 68.2

* Presented before a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 29, 1942.

NOTE: Dr. Dublin is now Associate Professor of Preventive Medicine and Community Health, Long Island College of Medicine, New York, N. Y.

TABLE 2

Reported Milk-borne Outbreaks Due to Serologically Typed Hemolytic Streptococci

Year Reported	*Place*	*Number of Cases*	*Griffith Type*
1936	Chelmsford, England [4]	1,600	2
1937	Doncaster, England [5]	364	2
1938	Mørkøv, Denmark [6]	100	Not typable
1939	Pinneberg, Germany [7]	450	5
1939	Vegle, Denmark [8]	128	3
1939	Romford, England [9]	18	2

See Bibliography

per cent of all cases. It is apparent, therefore, that these hemolytic streptococcus infections present the most important public health problem in the upstate New York area in terms of cases of illness resulting from outbreaks of milk-borne disease. Furthermore, very few milk-borne outbreaks of typhoid fever have occurred in recent years, so that hemolytic streptococcus outbreaks have assumed even greater relative importance.

In recent years, the Lancefield classification of hemolytic streptococci[1] has been utilized extensively in the search for the source of milk-borne outbreaks of scarlet fever and septic sore throat. By this means, beta hemolytic streptococci falling into Group A, the group including approximately 95 per cent of strains pathogenic for man, may be distinguished from those belonging to other groups. The value of this serological procedure is emphasized by the findings of Sherman and Niven[2] who have reported that beta hemolytic streptococci may be recovered from as high as 8.5 per cent of samples of commercial pasteurized milk, and 18.0 per cent of similar samples of raw milk. The prevailing strains isolated by these authors from pasteurized milk proved to be Group D and from raw milk Groups B and C.

The differentiation by Griffith[3] of the various hemolytic streptococci pathogenic for man into 30 or more serologically specific types has not only provided a more exact means of identification of the source of milk-borne outbreaks but also has permitted further study of the epidemiological characteristics of the different strains of these organisms. Since the introduction of this procedure, at least six reports of its use in conjunction with the investigation of apparently milk-borne outbreaks have been published and are summarized in Table 2.

All of these epidemics have been reported in the foreign literature. It is of interest to note that three of the six were attributed to Griffith Type 2 strains.

For a number of years, the Division of Laboratories and Research of the New York State Department of Health has undertaken the collection and preservation of strains of hemolytic streptococci recovered during the course of the epidemiological investigation of milk-borne outbreaks. This procedure permitted Stebbins to identify retrospectively by Griffith typing the specific strains of hemolytic streptococci encountered in certain earlier investigations.[10] Since July, 1940, an attempt has been made to conduct this phase of the study immediately following the recovery of the presumptive causative organism. A tabular presentation of the studied epidemics is given in Table 3.

Griffith's Type 3 hemolytic streptococcus has been identified more frequently than any other single type, being encountered in three of the nine outbreaks investigated.

Each of the outbreaks enumerated

TABLE 3

Milk-borne Outbreaks Due to Serologically Typed Hemolytic Streptococci
New York State, Exclusive of New York City

Date	Place	Disease	No. of Cases	Griffith Type	Mode of Contamination of Milk
March, 1935	Baldwinsville, Onondaga Co.	Septic sore throat	500	27	Infection of cow's udder
Jan., 1936	Wellsville, Allegany Co.	Scarlet fever	201	3	" " " "
Dec., 1936	Owego, Tioga Co.	Scarlet fever	532	15–17 *	" " " "
July, 1940	Waddington, St. Lawrence Co.	Septic sore throat	48	19 †	Direct infection of milk (?)
Sept., 1940	Kirkwood town, Broome Co.	Scarlet fever	6	not typable	Infection of cow's udder
Jan., 1941	Pultney, Steuben Co.	Scarlet fever	33	3	" " " "
Nov., 1941	Huntington Sta., Suffolk Co.	Septic sore throat	116	11–12 *	" " " "
April, 1942	Cannonsville, Delaware Co.	Scarlet fever	44	3	" " " "
April, 1942	Coxsackie, Greene Co.	Septic sore throat	200	2	" " " "

* Cross-typing
† Typing inconclusive but strongest agglutination with type 19 antiserum

provides interesting data relative to the epidemiological characteristics of milk-borne epidemics due to serologically typed hemolytic streptococci. The present report, however, will be limited to various phases of one of the more recent smaller outbreaks; namely, that which occurred in Cannonsville, Delaware County.

CANNONSVILLE OUTBREAK

During April, 1942, a small milk-borne outbreak of hemolytic streptococcus throat infections occurred in this relatively isolated rural community of approximately 275 inhabitants. It thus provided a unique opportunity to investigate the distribution of hemolytic streptococci among the general population. Moreover, the incriminated milk was found to have been secured from a large cheese plant handling milk from 356 producers, making the determination of the actual source of infection a distinct challenge.

Records of illness were obtained by house-to-house survey for 28 of 197 persons interviewed in Cannonsville and for 16 of 42 individuals in the surrounding area. Thus the outbreak involved 44, or 18 per cent, of the 239 persons included in the study group. Seventy-seven per cent of the cases occurred in persons 15 years of age or over, and 61 per cent among males.

All of the cases occurred during the 3 week interval between April 5 and April 25. The dates of onset are shown graphically in Figure 1.

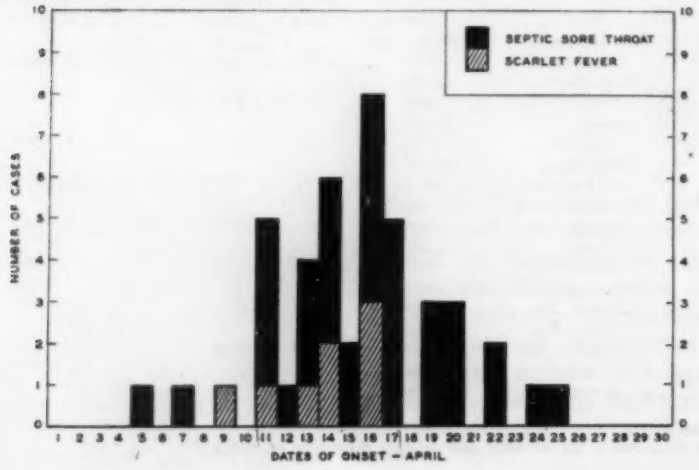
Thirty-seven of the 44 persons affected had first symptoms between April 11 and April 20, the peak daily incidence of 8 cases occurring on April 16.

CLINICAL CHARACTERISTICS

Illness was characterized by sudden onset of sore throat, fever (up to 103° F.), headache, cervical lymphadenopathy, and generalized arthralgia and myalgia. No deaths occurred among the 44 cases. In 8 instances, scarlatinal rashes were observed and, since the causative organism thus demonstrated its ability to elaborate erythrogenic toxin, this observation again indicates how illogical it is to distinguish between

FIGURE 1

DATES OF ONSET OF 44 CASES OF HEMOLYTIC STREPTOCOCCUS THROAT INFECTIONS
CANNONSVILLE, DELAWARE COUNTY
APRIL, 1942



cases of septic sore throat and scarlet fever.

A striking characteristic of the outbreak was that of the joint manifestations experienced by 16 patients, or more than one-third of those ill. In some instances, only transient involvement of one or two joints with pain and limitation of motion was noted but in others severe polyarthritis was experienced with swelling, redness, and tenderness about the joints. In this category, 4 cases of migratory joint involvement clinically suggestive of active rheumatic fever were observed and the persons so affected experienced an asymptomatic period of 1 to 2 weeks between throat symptoms and these joint manifestations. One of the persons affected had previously experienced an acute attack of rheumatic fever.

Throat cultures were secured from 35 of the 44 cases either at the time of, or shortly after, the acute episodes of sore throat. Twenty-three of these yielded hemolytic streptococci, 17 of which were identified serologically as Lancefield Group A, 2 Group B, 3 Group D, and 1 could not be classified. Fifteen of the 17 Group A strains were established as belonging to Griffith's Type 3, thus indicating this organism to be the epidemic strain; the 2 remaining Group A strains proved refractory to typing.

INCRIMINATION OF MILK SUPPLY

At the outset of the investigation, it was apparent that the cases occurring in the outbreak were particularly concentrated among workers in the Q cheese plant. This plant, employing 30 workers, constituted the sole large commercial establishment in the area and, with the exception of dairy farming, constituted the principal source of livelihood of the residents of the community.

Milk used in Cannonsville was found to be almost exclusively unpasteurized. Many families obtained milk from their own cows, a few purchased small quantities from three small dealers in the community, and the remainder of those using fluid milk secured their supply from the Q cheese plant. The majority of workers consumed milk while at work and were permitted to take milk

in their own containers for use at home. In addition, a few families residing in the immediate vicinity obtained their supply there although no members were actually employed in the plant. Table 4 presents the attack rates experienced by consumers and non-consumers of milk from the Q plant according to the type of their association with this establishment.

TABLE 4

Attack Rates among Consumers and Non-consumers of Milk from the Q Cheese Plant According to Association with Plant

Outbreak of Hemolytic Streptococcus Throat Infections
Cannonsville, Delaware County, April, 1942

Association with Cheese Plant	Consumers Q Plant Milk		Non-consumers Q Plant Milk		Total		Attack Rate Per cent		
	No.	Cases	No.	Cases	No.	Cases	Consumers Q Plant Milk	Non-consumers Q Plant Milk	Total
Plant workers	25	15	5	2	30	17	60.0	40.0	56.7
Persons living in households of plant workers	39	14	34	2	73	16	35.9	5.9	21.9
Others	19	9	117	2	136	11	47.4	1.7	8.1
Total	83	38	156	6	239	44	45.8	3.8	18.4

Regardless of consumption of milk from the plant, the workers experienced the highest frequency of illness, 56.7 per cent being affected. Almost 22 per cent of the household contacts of these workers also were ill but those in this group consuming milk from the plant experienced symptoms approximately six times more frequently than those denying use of this milk. Only 2 individuals, or 1.7 per cent, of those having no contact with the plant and denying use of milk from this source were ill. These 2 patients had onset late in the course of the outbreak, one on April 20, and the other on April 26, and it is believed represent either secondary cases or coincidental, sporadic, sore throats unassociated with the outbreak. The 9 cases occurring among users of the milk in households in which no member was employed at the plant afford further confirmation of the hypothesis that infection was transmitted by the milk.

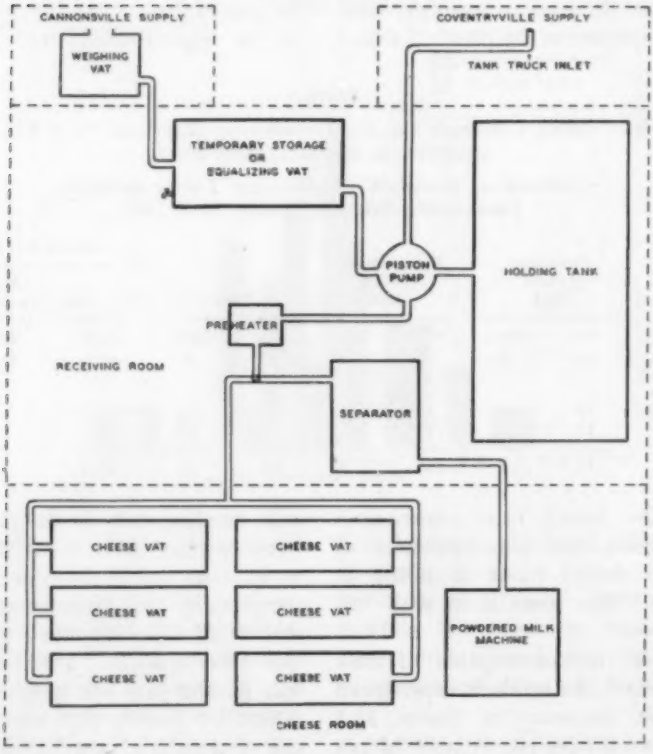
SEARCH FOR SOURCE OF INFECTION

At the time of the investigation, the bulk of the milk was being utilized in the production of cheddar type cheese. Of the approximately 123,000 lbs. of milk handled daily in the plant, 48,000 were received from local dairymen in 40 qt. cans and 75,000 were brought to the plant by tank truck from a receiving station in Coventryville, some thirty-five miles distant. The local product was poured into the weighing vat and flowed by gravity to a temporary storage or equalizing vat (Figure 2). The bulk of this was usually used immediately by pumping through a preheater to a separator or to the cheese-making vats.

The Coventryville supply was pumped directly from the tank trucks to the holding tank and from there to the preheater and separator or to the cheese vats.

The employees drinking milk at the plant did so in the cheese room. A common dipper was used and the milk was taken either from a pipe coming from the storage tanks or directly from the cheese vats. Milk to be used outside the plant was obtained from an outlet from the temporary storage vat in the receiving part of the plant. Since the use of this milk was known to have resulted in illness and it came from that part of the plant where contamination

FIGURE 2
SCHEMATIC DIAGRAM
Q CHEESE PLANT
CANNONSVILLE, DELAWARE COUNTY



from a human source was least likely to occur, the source of infection of the milk appeared to exist prior to receipt of the milk at the plant. Moreover, since the Coventryville tank truck supply only rarely was introduced into the temporary storage vat, suspicion was directed chiefly toward the local supply reaching the plant in 40 qt. cans.

The 123,000 lbs. of milk brought to the plant daily were supplied by 356 producers and represented the output of 6,069 cows. Although the epidemiological evidence suggested that the source of infection of the milk probably existed on one of the 116 farms contributing to the supply brought directly to Cannonsville, a systematic examination was made of each of the 2,029 cans of milk received at both of the depots. A Breed smear examination was made of samples of each of these cans. On the basis of the presence of chained streptococci or excessive numbers of leucocytes (an estimated 500,000 or more leucocytes per ml.), 73 of the 356 herds were selected for further study. Each of these 73 producing farms was subsequently visited and, in addition to careful examination of each cow in these herds, information was obtained with respect to history of teat injury among the cows, or illness or superficial infections among residents of the farm. Whenever histories of teat injury were obtained or evidence of bovine mastitis was discovered, samples of milk were taken for bacteriological examination.

A total of 150 such quarter samples of milk from cows in 55 herds were examined and from 17, or 11.3 per cent, beta hemolytic streptococci were isolated. Each of these strains was identified serologically: one was found to be Lancefield Group A, 8 Group B, and a similar number Group C. The Group A organism was further identified as Griffith Type 3, identical with the strain previously demonstrated as the cause of the outbreak.

The milk containing the Type 3 hemolytic streptococci came from a cow on a farm sending its milk directly to Cannonsville. The cow had had its right hind teat stepped on and crushed some time in late February or early March, approximately 6 weeks prior to the beginning of the outbreak. The resultant injury had been treated by the son of the owner of this particular farm, and a teat dilator and milk tube had been used repeatedly in an effort to maintain this animal in the milking line. At the time of the veterinary examination on April 23, a severe, acute mastitis was found to involve the affected quarter.

Nineteen other cows in the herd were found to be normal, and 1 proved to be suffering from a benign mastitis due to an organism other than beta hemolytic streptococcus.

Histories of recent illness were obtained from 3 of 7 members of this household including the boy who had cared for the cow's injured udder. The first person affected was the mother, who experienced a severe attack of so-called "grippe" in late March. Shortly thereafter the 14 year old daughter developed scarlet fever. The son next developed a severe sore throat with fever and swollen glands in the neck. He was sufficiently ill to spend several days in bed and to consult a physician. The dates of onset in the mother and daughter definitely preceded the outbreak. It seemed impossible to ascertain definitely the date of onset in the boy, but he sought medical care about April 18, and he had been suffering for some time before that. It appears likely, therefore, that his onset also antedated the outbreak, and in view of his caring for the incriminated cow he seems the most probable source of the cow's infection.

Repeated throat cultures were taken from this boy's throat, and were consistently negative for hemolytic streptococci; however, the first culture was taken approximately 2 weeks after cessation of his acute symptoms. Group A beta hemolytic streptococci were isolated from the throats of both of the other persons on the farm who were ill, and upon typing were found to be Type 3.

THROAT CULTURE SURVEYS

We were curious as to the prevalence of the Type 3 hemolytic streptococcus in the community, and as to the extent to which it might be disseminated subsequently through the population. Accordingly, at the time of, and again at approximately 1 and 2 months after the outbreak, throat cultures were obtained from a large sample of the population. Persons cultured included workers in the Q plant, non-employees who consumed milk from this source, and individuals having no contact of any sort with the plant. The bacteriological findings of these surveys are presented in Table 5, and shown graphically in Figure 3.

In the first survey, at the time of the outbreak, 30 of the cases occurring among consumers of milk from the Q plant were cultured and 15, or 50 per cent, were positive for the Type 3 hemolytic streptococcus. Of 33 additional consumers of Q milk who did not become ill, 2, or 6.1 per cent, were found to be carriers of a Type 3 organism, whereas none of the 104 members of the general population who denied the use of Q milk were found to

TABLE 5

Results of Throat Culture Surveys
Outbreak of Hemolytic Streptococcus Throat Infections
Cannonsville, Delaware County, April, 1942

First Survey (April 20–21)

	Drank Q Milk			Did Not Drink Q Milk		
	Cases	Not Cases	Total	Cases	Not Cases	Total
Number Cultured	30	33	63	5	99	104
Number Positive						
Hemolytic Streptococci	22	13	35	1	26	27
Group A	17	2	19	....	6	6
Type 3	15	2	17	....	....	....
Other than Group A	5	11	16	1	20	21
Per cent Positive						
Hemolytic Streptococci	73.3	39.4	55.6	20.0	26.3	26.0
Group A	56.7	6.1	30.2	....	6.1	5.8
Type 3	50.0	6.1	27.0	....	....	....

Second Survey (May 19)

	Drank Q Milk			Did Not Drink Q Milk		
	Cases	Not Cases	Total	Cases	Not Cases	Total
Number Cultured	21	32	53	6	91	97
Number Positive						
Hemolytic Streptococci	14	14	28	1	32	33
Group A	8	2	10	....	7	7
Type 3	5	....	5	....	....	....
Other than Group A	6	12	18	1	25	26
Per cent Positive						
Hemolytic Streptococci	66.7	43.8	52.8	16.7	35.2	34.0
Group A	38.1	6.3	18.9	....	7.7	7.2
Type 3	23.8	....	9.4	....	....	....

Third Survey (June 30)

	Drank Q Milk			Did Not Drink Q Milk		
	Cases	Not Cases	Total	Cases	Not Cases	Total
Number Cultured	12	27	39	5	89	94
Number Positive						
Hemolytic Streptococci	4	9	13	....	27	27
Group A	1	1	2	....	4	4
Type 3	....	....	....	....	....	....
Other than Group A	3	8	11	....	23	23
Per cent Positive						
Hemolytic Streptococci	33.3	33.3	33.3	....	30.3	28.7
Group A	8.3	3.7	5.1	....	4.5	4.3
Type 3	....	....	....	....	....	....

harbor Type 3 streptococci. At the time of the second survey on May 19, the percentage of cases among Q milk consumers who still harbored the Type 3 organism had dropped to 23.8 per cent. None of the other consumers of Q milk were found to carry the Type 3 streptococcus, and again no Type 3 carrier was found among the general population denying use of Q milk. At the time of the third survey on June 30, no Type 3 streptococcus was encountered, and all three groups were essentially uniform as to the percentage of hemolytic streptococci isolated, and the percentage of these in turn which were of Group A.

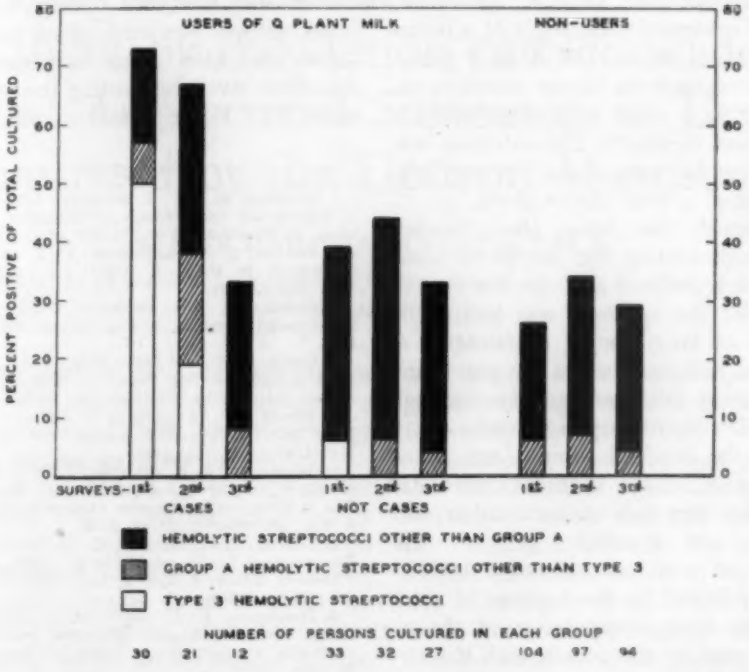
It is of interest that the frequency of nasopharyngeal carriers of all hemolytic streptococci and of Group A strains as well in the population unexposed to the Q milk remained relatively constant throughout the three surveys.

CONTROL MEASURES

As soon as preliminary evidence suggested that the milk used at or taken from the plant was the probable vehicle of infection (April 17), the distribution of this milk for drinking purposes was

FIGURE 5

THROAT CULTURE SURVEYS
HEMOLYTIC STREPTOCOCCUS THROAT INFECTIONS
CANNONSVILLE, DELAWARE COUNTY



discontinued. On April 23, the cow ultimately incriminated was segregated and its milk discarded. On April 28, results of typing the hemolytic streptococcus isolated from samples of milk from this cow were available and indicated that it was the cow probably responsible for the outbreak. It was slaughtered on May 8. When udder tissue obtained at autopsy was submitted for bacteriological examination, Type 3 organisms were again recovered.

As previously stated, the principal product of the Q plant was cheddar type cheese and it was known that this cheese was being purchased by a large dealer for possible shipment to England. All cheese processed and stored in the plant between April 5, the date of last shipment, and April 22, when pasteurization of milk was begun, was embargoed. Samples were taken from cheese processed on each day during the interval and although large numbers of beta hemolytic streptococci were readily recovered from them, none of the many strains studied proved to be members of Lancefield's Group A. Because it was impossible, nevertheless, to state that strains of hemolytic streptococci pathogenic for man were not present in the cheese, it was treated by a process in which it was heated to a temperature of over 170° F. for several minutes, insuring destruction of any pathogenic microörganisms which might be present.

SUMMARY

An attempt has been made to determine the Griffith type of hemolytic streptococci isolated in nine milk-borne outbreaks of hemolytic streptococcus

throat infections in New York State from 1935 to 1942. A different type has been encountered in each outbreak with the exception of three outbreaks due to Type 3.

The epidemiological study of a recent outbreak of 44 cases of Type 3 hemolytic streptococcus throat infection occurring in a small rural community is described in detail. The infection was found to be transmitted by raw milk secured at a local cheese plant.

Although the cheese plant handled milk representing the output of 6,069 cows, it is believed that the cow responsible for the outbreak was located by means of Breed smear examination of cans of milk received at the plant, and subsequent veterinary and bacteriological follow-up of suspected herds.

On the involved farm it was found that prior to the outbreak there had been one case each of scarlet fever, sore throat, and so-called "grippe." The suspected cow had suffered a teat injury, followed by development of acute mastitis upon manipulation of the injured part by the person with the sore throat. Hemolytic streptococci obtained from the throats of people on the farm and from udder tissue secured from the cow at autopsy also were found to be Type 3.

Three throat culture surveys were made in the community, the first at the time of the outbreak, the second a month later, and the third approximately two months after the outbreak.

In the first survey, Type 3 hemolytic streptococci were found only in throats of consumers of milk from the incriminated cheese plant. The per cent infected with this type was less in the second survey, and in the third survey no Type 3 hemolytic streptococcus was isolated.

To prevent any possibility of transmission of the infection through the cheese, that produced during the outbreak period was embargoed and released only after being reprocessed by a method involving heating the product above 170° F. for several minutes.

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Changes in the Bacterial Cell Brought about by the Action of Germicides and Antibacterial Substances as Demonstrated by the Electron Microscope*

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THE electron microscope is giving us new insight into fine structure in a great variety of fields. In bacteriology it is yielding an altogether clearer picture of the normal morphology of the bacterial cell. The present paper is submitted as evidence that the electron microscope is capable also of revealing structural changes brought about by antibacterial agents, and thus contributing to an understanding of the mechanism of action of such agents. Three special cases will be cited: (1) the action of simple salts of heavy metals, (2) the action of flagellar and somatic agglutinins on *Eberthella typhosa*, (3) the pneumococcal capsular swelling reaction.

Electron pictures of bacteria after brief exposure to salts of silver, lead, mercury and nickel have shown the bacterial inner protoplasm, but not the cell-walls, to be selectively darkened; shrinkage, coagulation, or escape of protoplasm from the injured cells may result and be recorded in the electron micrographs.[1] To what extent more complex chemical germicides and antibiotic substances will produce structural changes which can be recorded by electron micrography is a question for future investigation.

Electron pictures have been taken of cells of *Eberthella typhosa* exposed to homologous rabbit antiserum.[2, 3] Specific combination with flagellar and somatic antibodies results in the formation of antibody films on the surfaces of the bacterial flagella and cell walls. The thickness of these films may increase with time of exposure to antiserum and with concentration of antiserum. Measurement of the thickness of the films deposited under various conditions are compatible with their interpretation as monomolecular films in which an ellipsoidal antibody-molecule[4, 5] is oriented with its long axis either approximately parallel to or approximately perpendicular to the plane of the antigenic surface, depending upon concentration and other experimental conditions; however, the alternative possibility that the observed change in thickness of deposited film with antibody concentration may be due to secondary adsorption of nonspecific protein from the antiserum upon the primary antigen-antibody complex, has not thus far been excluded.

Electron micrographs of the capsular swelling of pneumococci after exposure

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

to homologous rabbit antiserum [6] reveal a phenomenon quite different from those cited above. The increase of the capsule in thickness amounts to 2,000 Å or more, or many times the long diameter of the globulin molecule. The polysaccharide of the pneumococcal capsule is described as composed of thread-like molecules.[7] The electron pictures are compatible with the interpretation that these molecules form a gel into whose interstices the antiserum molecules penetrate; the capsule increases in size and density in consequence of this impregnation.

The electron micrographs were taken by Dr. T. F. Anderson at the RCA Research Laboratories at Camden, N. J., and by F. Heinmetz at the Johnson Foundation for Medical Physics, the University of Pennsylvania.

SUMMARY

The electron microscope has revealed structural changes in bacteria dependent upon, (a) penetration of heavy metal ions or molecules into the bacterial cell and interaction with the inner bacterial protoplasm; (b) the formation of surface films of antibody upon bacterial flagella and cell-walls; the thickness of these films is compatible with their being monomolecular, but this need not necessarily be the correct interpretation; (c) the impregnation of a capsule outside the bacterial cell-wall, a great increase in size and density resulting. The electron microscope is thus shown to be a new analytical tool for investigating the mode of action of at least some germicidal and antibacterial substances.

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1943 Victory Book Campaign

The 1943 Victory Book Campaign is under way and will continue until March 5. The slogan in this year's drive for books for the armed forces is "Any book you really want to keep is a good one to give." Fiction, adventure, western and detective stories are asked for and technical books published since 1935 in the fields of architecture, aeronautics, chemistry, drawing, machine mechanics and design, mathematics, mechanical drawing, meteorology, military science, navigation, photography, physics, radio, shop mechanics, etc.

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Epidemiological and Experimental Observations on the Possible Significance of Rodents in a Suburban Epidemic of Poliomyelitis*

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IT is the purpose of this communication to record briefly preliminary observations bearing (a) on the recovery of a rodent-paralyzing virus from house mice collected in an endemic area of human poliomyelitis, and (b) on the apparent transfer of poliomyelitis virus to rodents from one of the human cases involved in this epidemic. Since the two sets of observations were made in the course of the same epidemic and the results serve to supplement each other, the pertinent data are here reported together.

I. RECOVERY OF A RODENT-PARALYZING VIRUS FROM HOUSE MICE IN ASSOCIATION WITH A LOCALIZED OUTBREAK OF HUMAN POLIOMYELITIS

Within a sharply circumscribed half square mile area in White Plains, Westchester County, N. Y., bounded by the Bronx River and a tributary brook, 5 cases of poliomyelitis occurred in the fall of 1942. The cases followed each other in rapid sequence between the end of September and the beginning of October. They were the only cases of this disease reported in the entire city for the current year, though 2 cases of poliomyelitis had been reported in this locality during the previous year. The epidemic involved 2 adults and 3 children, all of whom were treated at the Grasslands Hospital, Valhalla, N. Y. Two patients died of bulbar paralysis and 3 recovered with extensive peripheral paralyses. Postmortem examination of both fatal cases revealed severe and typical lesions in the cord and medulla.

In searching for a possible extrahuman local source of contagion among rodents, a dead gray house mouse was discovered in the basement of the home of one of the fatal cases (M.M.), shortly after the patient's admission to the hospital; the animal had obviously been dead for only a short time. A second gray house mouse was trapped in this basement on the same day. Additional house mice, dead or alive, were later collected in other parts of the epidemic area. The brains of all mice were removed and, after storage in

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glycerin for a few days, failed to cause any growth upon inoculation of ordinary bacteriological media. Saline suspensions (10 per cent) were prepared from these mouse brains and injected intracerebrally into albino mice. Definite symptoms were observed in some albino mice following injection with brain material from 3 different house mice, *i.e.*, the dead mouse and the trapped mouse found in the home in which one of the fatal cases had occurred (M.M.), and another house mouse trapped in the neighborhood.

The symptoms appeared after an incubation period of from 5 to 14 days and were characterized by ruffled fur, excitement, strong tremors, nervous movements of the forepaws, and occasional convulsions with respiratory failure. In some mice these initial symptoms progressed to paresis of both front and hind legs and terminated in death; in others, the symptoms were of a transitory character and the animals recovered. This syndrome was further transmissible in albino mice by intracerebral but not by intraperitoneal transfer of 10 per cent brain and cord suspensions from the affected mice.

While all lines of transmission originating from trapped healthy house mice came to an abrupt end after one or two laboratory passages, transmission of the infectious agent recovered from the dead house mouse has been maintained, so far, over twelve serial passages in albino mice. During the early passages the ratio between symptomless survival, convalescence, or death varied greatly from generation to generation. With subsequent passages the incubation period shortened and the described nervous symptoms became more pronounced, resulting in death of most of the injected animals and frequently in complete flaccid paralysis of one or more extremities. With later passages, mice could also be infected by the intraperitoneal route. Intracerebral injection of passage-mouse brains into rabbits, guinea pigs, or rhesus monkeys failed to produce any symptoms; however, transfer to one cotton rat and two hamsters succeeded with the third and ninth mouse brain passage, respectively, leading to prostrating paralysis in the injected rodents. Sterility tests of several mouse passage brains showed them to be free from microörganisms cultivable on ordinary bacteriological media. On the other hand, the infectious agent passed easily through a Seitz filter.

Neutralization tests were carried out with later mouse brain passages by injecting young albino mice intracerebrally with mixtures of 10 per cent virus suspensions and various sera. The results of repeated tests indicated that the serum from 2 of the 3 convalescent patients neutralized virus to an appreciable extent (90 per cent survival among the injected mice), whereas neutralization was less marked with the serum from one of these patients collected during the early stages of the disease (60 per cent survival). Definite neutralization was also obtained with normal adult mouse serum (90 per cent survival), but not with normal rabbit serum (45 per cent survival). Pathological examination of mice which presented the fully developed paralytic disease showed extensive destruction of the anterior horns in various levels of the spinal cord, recalling the picture of "rodent poliomyelitis." In other words, the lesions were generally similar to those observed in mice suffering from Theiler's disease,[1] or in mice paralyzed by infection with either the mouse-adapted Lansing,[2] or the SK [3] murine strains of human poliomyelitis virus.

The exact nature of this virus is not known at present. In view of its relatively low pathogenicity for albino mice, it has not been possible accurately to titrate potency, determine limits of

filterability, study various routes of invasion, investigate the range of susceptible hosts, or carry out more extensive neutralization tests. However, the filterability of the infectious agent, together with the symptomatology and pathology of the disease which it produces in albino mice, may be taken as suggestive evidence that we are dealing with a virus of the poliomyelitis group, perhaps identical with or related to the FA strain of Theiler's virus of "spontaneous mouse encephalomyelitis."[4] This conclusion would be strengthened by the fact that a small group of mice which had survived this virus infection resisted intraperitoneal reinfection with a standard strain (GD VII) of Theiler's virus, whereas normal control mice developed paralysis. It should be noted, however, in this connection that heretofore Theiler's virus has not been encountered in healthy gray house or field mice (brain or intestines) trapped at a distance from the laboratory.[5] Final identification of the described infectious agent and the relationship, if any, which may exist between its local carriage by house mice and the synchronous outbreak of human poliomyelitis are problems which are at present under investigation.

II. ISOLATION OF A RODENT-PARALYZING VIRUS BY PASSAGE OF HUMAN POLIOMYELITIS VIRUS TO SYRIAN HAMSTERS, EASTERN COTTON RATS AND ALBINO MICE

Attempts to corroborate the clinical and pathological diagnosis of poliomyelitis in the 2 fatal cases referred to above were made by tests in rhesus monkeys. Intracerebral injection of a monkey with brain and cord material from one of the fatal cases (T.D.) failed to produce any symptoms. However, prostrating paralysis, with typical cord lesions, occurred in another monkey following intracerebral injection with a suspension from cord and medulla of the second fatal case (M.M.). Intracerebral transfer of this monkey cord to another monkey failed to transmit paralysis but caused death in a hamster on the 20th day after injection. At the same time the original human material was also injected intracerebrally into other laboratory animals, i.e., 1 rabbit, 3 guinea pigs, 19 albino mice, 2 cotton rats, and 1 hamster. None of the injected animals showed any definite signs of disease, except for the hamster, which appeared sick on the 18th day after injection and was found dead the next morning. Intracerebral transfer of this hamster's brain to another hamster caused in the latter animal complete flaccid paralysis of both hind legs within 5 days. Further intracerebral passage of the paralyzed hamster's brain to 2 new hamsters, 2 cotton rats, 5 albino mice, 1 rabbit, and 1 rhesus monkey was followed by prostrating paralysis, within 2 to 3 days, in all injected small rodents. The monkey developed a transient fever but remained free from recognizable paralysis; no symptoms were observed in the rabbit. From this point it was possible to transmit the disease serially through passages of hamsters and mice, using both intracerebral and intraperitoneal routes of injection.

The infectious agent proved filterable through Seitz filters; it passed readily through graded collodion membranes of 50 mu APD and with considerable difficulty through membranes of 26 mu APD, but was completely retained by membranes of 10 mu APD. The probable size of the virus particle may therefore be assumed to lie in the neighborhood of 10 mu. Of special interest is the enormous potency and invasiveness of this virus. In both intracerebral and intraperitoneal tests dilutions between 10^{-3} and 10^{-5} were capable of inducing paralysis in hamsters, while dilutions as high as 10^{-11} sufficed to paralyze albino mice, by either intracerebral or intra-

peritoneal injection, within an incubation period of from 24 hours to 5 days.

Pathological examination of paralyzed hamsters and albino mice revealed the presence of typical and severe poliomyelitic lesions in the entire central nervous system. Neutralization tests were carried out by injecting albino mice intraperitoneally with mixtures of mouse passage virus and various sera. The results of repeated tests may be summarized as follows: A high degree of virus neutralization was obtained with a rabbit antiserum against Theiler's virus (1 million paralytic doses) and with a rabbit antiserum against SK murine virus (10,000 paralytic doses)[6]; a moderate or slight degree of virus neutralization occurred with an antipoliomyelitis (monkey virus) hyperimmune horse serum (100 paralytic doses) and with three convalescent sera collected from surviving patients in this epidemic (10 paralytic doses). Control sera which failed to neutralize the virus at the indicated levels were normal horse, rabbit, and hamster serum.

From what has been said before, it is clear that the cord and medulla of the fatal case (M.M.), upon direct inoculation, was capable of causing paralysis in one rhesus monkey only. It also appears that the human material was primarily non-pathogenic for cotton rats and albino mice, but that intermediary hamster passage had evidently brought about some change in the virus which made it possible subsequently to maintain multiple paralytic passages in several species of rodents, including hamsters, cotton rats, and albino mice.

The above facts, while suggesting that a direct transfer of poliomyelitis virus was obtained from man to hamster—with further transfer from hamster to cotton rats and white mice—are admittedly insufficient actually to prove such transmission. The possibility that accidental contamination may have occurred with a latent virus, or with a virus carried in the laboratory, cannot be ignored. However, the circumstances under which these observations were made and the trend of the available data would tend to minimize the chances for such a contamination. It is hoped that further work, which is in progress, will help to clarify not only this problem but make it possible to pass final judgment on the identity or non-identity of the two paralyzing viruses isolated from man and mouse in the course of this epidemic.

CONCLUSIONS

A rodent-pathogenic virus which paralyzes albino mice, cotton rats, and hamsters was isolated from the brain of a house mouse found dead in the home of a fatal case of human poliomyelitis. Another rodent-pathogenic virus capable of inducing paralysis in albino mice, cotton rats, and hamsters was isolated from the brain stem of this fatal case. The two viruses, when passaged in albino mice, are similar in that both are completely inactivated by antisera against Theiler's virus of mouse encephalomyelitis and show some neutralization with convalescent sera from patients involved in this epidemic. They differ however markedly in virulence for albino mice in that the human virus is much more potent than the mouse virus.

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GENITOINFECTIOUS DISEASE AND EMPLOYMENT

THE above heading is the title of an article which appeared in the October, 1942, issue of the *Bulletin of Genitoinfectious Diseases,* published by The Massachusetts Society for Social Hygiene, Inc. The author is Dr. N. A. Nelson, of The Johns Hopkins University, School of Hygiene and Public Health.

The attention of *Journal* readers is earnestly called to this paper, for here Dr. Nelson attempts to bring a modicum of order out of the confusion of measures instituted in one direction or another, by one agency or another, for the control of venereal diseases. He throws into startling relief the fact that we have made somewhat of an unholy hash of such measures, in that persons with positive sera and no other evidence of syphilis, are in many instances assumed to be in a communicable stage, and on this basis it is common practice to exclude them from employment.

To undertake further to paraphrase and condense the article in question would be unwise, for to get its full savor one must read it as a whole. However, two passages will give an idea of the incisiveness of Dr. Nelson's thinking, and, it is hoped, will encourage *Journal* readers to go back to the original. The author says:

"It has been easy to persuade industry to do blood testing because industry thought it could see something of advantage to itself in the procedure. The health department wanted to find infection and treat it, but instead of saying so, it has sold the idea to industry as a measure for the protection of industry. It has dwelt so long and loudly upon the dangers of genitoinfectious disease that employers have concluded that the only safe way out is to exclude the infected from employment altogether.

"There is no relationship whatever between the positivity or negativity of a blood test and the infectiousness of syphilis. A person with an early primary lesion, or one with an inadequately treated and potentially infectious early syphilis, may have a negative test. The majority of detectable infections to be found in any community, at any given time, are non-communicable by virtue of their age, or as the result of treatment; yet most of them will produce positive tests. Thus, the argument that a positive test should serve to exclude a person from employment, because syphilis is a communicable disease, is fallacious."

Copies of the publication in which Dr. Nelson's article appears may be obtained from the Massachusetts Department of Public Health, Room 545, State

House, Boston. We are glad to act as publicity agent in this instance, for only through such approaches as this sane one of Dr. Nelson's shall we be able to disentangle some of the knots that have been tied by emotion, wishful thinking, and opportunism.

A SOUR OBSERVATION ON THE LANHAM ACT

FEDERAL legislation relating to the public health moves somewhat fast and confusingly in these days of stress and change. As to that bit of it known as the Lanham Act, we find that we must keep our editorial fingers crossed. The Act provides that federal grants may be made for the purpose of increasing or providing public works in those areas where, because of war activities, similar existing facilities are inadequate. Undoubtedly, many localities will be benefited through this Act and, from a broad national standpoint, it is quite logical and only fair that the federal government bear a part of the financial burden carried in various localities when that burden is heavy because of national interests and activities. There is, however, in this Act a disquieting feature in so far as federal public health administration is concerned. Thus, though the intent of the Act in its relation to health is stated specifically to be the provision of facilities and public works (water and sewerage system, garbage disposal, recreational facilities, hospitals, etc.), there seems danger that the operation of a local public health service, voluntary or official, may be interpreted as coming within the definition of "public works." It is to be hoped, and sincerely hoped, that those responsible for the administration of the public health aspects of the Act will not go seriously into the business of subsidizing health services. The need for public health facilities in the areas in question is sufficient to absorb all the funds available and, in the provision of such facilities, the administrators of the Lanham Act have the ample experience of the Work Projects Administration upon which to draw. They do not know, nor are they now likely to be able to employ persons who know, either the relative seriousness of public health problems or the comparative values of local public health practices. Further, for the Lanham Act administrators to enter into subsidy of local health services would put into this field still another national administrative unit with money to spend and terms to lay down. The situation is confused enough as it is, but to introduce into it a new federal group which would deal with the thousands of local health agencies in the United States, is likely to create far more chaos than benefits.

Many will have forgotten that we went through a somewhat similar mushroom growth of federal health agencies in World War I. The situation became so distressing that Mr. Wilson finally put an end to it by a Presidential order, placing under the U. S. Public Health Service all federal public health activities except in relation to the Army and Navy. It is, of course, too much to hope that Mr. McNutt would be willing to put all the Federal Security Agency's health activities under the Service, or that the President might on a major scale similarly pull together the public health activities scattered throughout the federal government.

It is not a bad idea, at that.

BOOKS AND REPORTS

Introduction to Parasitology—*By A. S. Pearse. Baltimore: Thomas,* 1942. 357 pp. Price, $3.75.

In the preface, the author of this book states that it is intended primarily for college students. This book, therefore, represents no major contribution to the excellent texts already available on the subject of medical parasitology. With this in mind one cannot be too critical of deficiencies in the text, namely, in relation to the handling of the clinical and therapeutic aspects of human parasitic diseases. On the whole, it is felt that for medical students, public health men, and practitioners, this book is not to be recommended as a practical text or source book on the subjects of diseases produced by animal parasites. It would seem worth while if one were getting a text, to invest the extra few dollars if necessary and obtain one of the more recent books especially written for medical men.

For college students, the material in Pearse's text seems well presented and profusely illustrated by fairly good drawings.

HARRY MOST

A Venture in Public Health Integration—*The 1941 Health Educational Conference of the New York Academy of Medicine. New York: Columbia University Press,* 1942. 56 pp. Price, $1.00.

Because this brief book needs so badly to be read by public health administrators and by everyone among us who is in a position of power or trust, the words "health education," I suspect, were purposely omitted from the name given to these transactions. Whether or not that is the reason for choosing the provocative wording of the title, this is no manual, handbook, or working guide for health educators. Instead it is a statesmanlike discussion of the rôles of the practising physician, the voluntary agency staff member, and the public health official in an integrated plan of adult health education.

First to be considered, is the growing significance of geriatrics in public hygiene and, with it, the opportunity and the duty of practising physicians to improve the health of the aged through lifetime personalized guidance.

After a merciless dissection of most of the faults of our present-day hodgepodge of educational effort, the second part proposes a nationally planned attack to orient objectives, to formulate state and community programs, and to direct research in content and method.

Certainly one of the most stimulating definitions of health education thus far propounded introduces the last part of the discussion. Though it is almost two pages long, when it is ended, the whole problem stands out sharp and clear before a background of fact. Whoever the belted and spurred officers may be, the slogging, sweating infantry in this war against ignorance is the local health department. It alone can fit teaching to need, can reach those whose necessity is greatest, can make education work.

Yes, every one of us needs badly to read this book.

RAYMOND S. PATTERSON

Get More Out of Life — How Troubled People Can Find Help—*By Catherine Groves. Introduction by Dr. Howard W. Odum. New York: Association Press,* 1941. 136 pp. Price, $1.25.

Counsellors as well as persons in need

of counsel will be helped by reading this interpretation of one of the most recent and least understood fields of social service.

Out of a background of training and practical experience, the author interprets clearly and concisely why people can be helped by discussing personal problems with someone who may be able to get a perspective and who is neither a friend nor a relative. Practical illustrations are skillfully used to clarify various problems in human relationships which may arise.

Emphasis is placed upon the need of professional skill in counselling, although backgrounds of training may vary. Physicians, psychiatrists, educators, clergymen, social workers, and nurses all have opportunities for helping persons in trouble. They will find it worth while to read this excellent analysis of how to help people to help themselves.

Stress is placed upon the limitations of the counselling field. A good counsellor knows when other skills are needed and does not hesitate to refer clients to a specialist when indicated.

A section of the book deals with the danger of charlatanism and advises persons in trouble how to find the service needed.

VALERIA HOPKINS PARKER

The Amateur Scientist. Science as a Hobby *(Two Appendices)—By W. Stephen Thomas. New York: Norton,* 1942. 291 pp. Price, $3.00.

As pointed out in the Foreword, Benjamin Franklin, who founded the American Philosophical Society in 1780, was one of the greatest of amateur scientists, and Philadelphia, in which he spent much of his life, has been noted for the cultivation of science among amateurs. It is fitting therefore that the society which he founded and which has its home in Philadelphia should sponsor a Committee on Education and Participation in Science. The present book is based largely on the researches and findings of that committee, and the writer, secretary of the committee for three years, was Director of Education at the Academy of Natural Sciences, so that no better atmosphere could have been found for such a work.

The book begins with a study of the characteristics of amateur scientists in general and their motives for taking up as a hobby some branch of science, which, as the book shows, vary from the practical to the abstruse. Among amateur scientists, many of whom have made notable contributions, can be found all classes, from professional men in law and medicine, to brick masons, postmen, printers, office workers, etc. An Appendix gives the occupations of 727 men and women in the Philadelphia area who are interested in science as amateurs. These people represent 134 occupations classed under five headings, Professional; Business; Skilled and Semiskilled, Technical and Nontechnical; Service; and Miscellaneous. There are detailed studies of four sample subjects in which some 500 amateur scientists have taken part: Blooming Dates of Plants, Climatology and Tree Rings, Radio Ionosphere, and Report on the Project in Zoölogy.

The fact that a body such as the American Philosophical Society has considered it worth while to investigate the subject under a committee chosen for the special aptitude of its members insures us that the estimate of the importance and value of the amateur scientists is fully justified. Indeed the project was proposed by the President of the Carnegie Corporation, and the offer made to supply financial support for the study of adult education in science in the Philadelphia area if the Philosophical Society would undertake it. Another very great advantage is to the amateur scientists themselves,

strikingly expressed as early as 1859, by Charles Kingsley, who wrote:

"I have known, again and again, working men, who in the midst of smoky cities, have kept their bodies, their minds, and their hearts healthy and pure by going out into the country at odd hours and making collections of plants, fossils, insects, birds, or some other objects in natural history."

A wide range of readers will find this book of interest and value. The printing and make-up are excellent and the illustrations are largely reproductions of photographs showing direct from life features of the studies which were made.

MAZŸCK P. RAVENEL

Tables of Food Values—*By Alice V. Bradley. (rev. ed.) Peoria, Ill.: Manual Arts Press,* 1942. 224 pp. Price, $3.50.

The revised edition of *Tables of Food Values* presents conveniently arranged data on composition of foods as eaten. Some such handbook is a "must" for any public health worker who has occasion to plan or evaluate diets on the basis of the daily allowances for specific nutrients recommended by the Committee on Foods and Nutrition of the National Research Council.

The nutritive values of a very large number of foods, raw, cooked, and combined in dishes, are given in two complete sets of tables. The tables in Part I, intended for rough estimation of the nutritive value of individual foods and typical diets, give values for average servings. The tables in Part II, suggested for use in computing the value of weighed diets, are based on 100 gram portions. In both sets of tables foods are arranged in 27 groups, starting with Beverages and ending with vegetables. The tables are unusually comprehensive, including many less common foods often omitted from such compilations.

The typography and the format of the tables are excellent. Reprinting the kind of food at the extreme right of each double page of figures is an especially happy device. The tables might be simpler and more useful if all data were expressed only in the same quantitative units used in the recommended dietary allowances of the National Research Council.

Anyone who compares the data for given foods in the various handbooks now in circulation will appreciate that most values are approximations to be used in rough estimates and broad comparisons. For such purposes it is probably wise to take all values from a single handbook and so to avoid adding still another variable to an inescapably long list. Before deciding which handbook to abide by, public health workers may well examine the revised edition of *Tables of Food Values.*

MARJORIE M. HESELTINE

A Handbook of Allergy for Students and Practitioners — *By Wyndham B. Blanton, M.A., M.D., Litt.D. Springfield, Ill.: Thomas,* 1942. 190 pp. Price, $3.00.

Blanton's *Handbook of Allergy* should fulfil well the purpose for which it is primarily intended. It is a synopsis-type work, for use by the undergraduate student, to be supplemented by personal instruction. It should also serve as a handy orientation volume for graduates who wish to become acquainted with the general subject of allergy. The discussion of treatment, both specific and symptomatic, is too abbreviated for the volume to serve adequately as a therapeutic reference aid. It is hoped that in the next edition treatment will receive more detailed discussion. When used as an undergraduate text, this becomes less of a problem since the student gains his therapeutic experience in the ward and clinic.

WARREN T. VAUGHAN

Ornithologists of the United States Army Medical Corps. *(Publications of the Institute of the History of Medicine, The Johns Hopkins University. First Series: Monographs, Volume 1)—By Edgar Erskine Hume. Baltimore: Johns Hopkins Press,* 1942. 583 pp. Price, $5.00.

The Medical Corps of the Army has given us many things of great scientific as well as practical value. We need mention only the greatest medical library in the world, the Army Medical School, "America's oldest school of preventive medicine," and the discovery of the transmission and prevention of yellow fever. Here we are told of the contributions made by Army medical officers to other branches of natural science, especially the study of the birds of the American continent.

We have been fortunate in the fact that the Surgeons General have, practically without exception, fostered scientific studies on the part of the officers, and many have purposely made assignments to foster scientific work of various types. This applies also to officers in command, such as General Leonard Wood, who was greatly interested in natural history and had much to do with the bird studies of many of the officers under him. The record is in striking contrast to some things which have happened elsewhere—for example, the near tragedy of repeated official interference with the work of Ronald Ross on malaria.

As far as the particular subject with which this book is concerned, it was fortunate that the Surgeons General as well as the Army medical officers under them between 1850 and 1860 were largely inspired by Baird of the Smithsonian Institution, created by Congress in 1846. Advantage was taken of railway and other expeditions—so much of the record of the ornithological activities of the Army medical officers have been preserved in such reports as those of the Pacific Railroad Surveys. There was from the beginning a happy union between the Medical Corps of the Army and the Smithsonian Institution, fostered by the marriage of Professor Baird, Assistant Secretary, to the daughter of Colonel Sylvanus Churchill, Inspector General of the Army. The Smithsonian Institution has profited tremendously and in that famous Museum there are to be found the fruits of the "extracurricular" labors and studies of the members of the Army Medical Corps.

The book contains sketches of 36 Army medical officers who have contributed to our knowledge of the birds of America, a number of whom did not confine themselves to birds, but covered other valuable features of natural history. Many specimens of mammals, reptiles, fishes, and other groups were sent to the National Museum in Washington, where they are now.

There was a method in the assignment of young officers to our western country where the Army was taking part in the "winning of the West." Many articles were written and many specimens collected during this development, and it is notable that the first draft of the great book by Surgeon Elliott Coues, *Key to North American Birds,* was written at Fort McHenry.

It is interesting to note also that a number of these army surgeons showed other talents and skills. The frontispiece of this volume, for example, is the Blue-headed fly catcher, printed from the original plate drawn and engraved on copper by Dr. Anderson. Others have written excellent poetry; some have painted.

There are many more things which one would like to say about this book. It contains much history of the period when the West was being opened up and the first railroads were being pushed

across the continent. Of the 36 Army doctors mentioned, there is not one whose life does not possess much of interest scientifically as well as of value historically.

The book contains 109 illustrations. There is at least one photograph of each individual, and for some of them there are several. There are pictures of many of the famous frontier posts of the Army and a number of ornithological specimens. There is a short "Conclusion" summing up the work of Army medical officers, the names of most of whom are familiar to the world, men who have placed the people of all countries in their debt. An excellent index adds to its value.

The book is beautifully made on glazed paper, and is a masterpiece of the printer's art. We must give full credit to the author, Colonel Edgar Erskine Hume, for an enormous piece of work competently done. He has placed all lovers of natural history and scientific men in general under obligation to him, and he himself has shown a large degree of that versatile ability for which so many medical officers of the Army have been noted.

MAZŸCK P. RAVENEL

Health Facts for College Students: a Textbook of Individual and Community Health—*By Maude Lee Etheredge. (4th ed.) Philadelphia: Saunders,* 1942. 364 pp. Price, $2.25.

The fourth edition of *Health Facts for College Students* impresses this writer, first as being well written for and about college students, with a clear and sympathetic understanding of their problems; second, hygiene for this group is well discussed but with too little explanation. To illustrate, with regard to nutrition, the existence of body types is noted but the fact that these types are often mistakenly dieted to have them conform to the standard height-weight tables is not explained. Students will benefit from having received health education in some form or other before entrance to college but to keep their interest they must be stimulated by a real academic challenge. Supplemented by more detail and explanation, this book can play a definite part as a text in a course in college hygiene.

GRETTA WREN

Chemistry of Insecticides and Fungicides—*By Donald E. H. Frear. New York: Van Nostrand,* 1942. 300 pp. Price, $4.00.

This is an account of the chemical substances used primarily in agriculture and to some extent in industry as a protection against the attacks of insects and fungi upon plants and their products. It does not cover the protection of animals and their products from attacks by these organisms. It is of value and interest to public health because of the use of preparations of arsenic, fluorine, thallium, and other toxic substances as protective sprays upon fruits and vegetables and as poisons for destructive rodents. Detailed directions are given for the various chemical processes used in testing for the presence and amounts of these toxic substances.

Wood preservation by creosote and other organic materials is referred to only casually. The widespread use of arsenicals by fruit growers and gardeners, and their removal by uncontrolled washing devices, if at all, creates a potential health hazard which rarely comes to medical or public attention, much less to critical testing by competent public health authorities. The ephemeral nature of the results upon the individual consumer makes detection and prevention doubly difficult.

More inspection and analysis by health authorities is imperative to determine the sources, extent, and nature of these hazards. This book is a help to these ends.

CHARLES A. KOFOID

Eat What You Want—A Sensible Guide to Good Health through Good Eating—*By W. W. Bauer, M.D., and F. M. Bauer. New York: Greenberg,* 1942. 263 pp. Price, $2.00.

This volume contains a surprising amount of exact nutrition information, presented in a popular style by a trained publicist. It attempts to make the acquisition of this knowledge as painless as possible and succeeds very well if the reader be above average in intelligence, and does not object to a loquacious rather patronizing style of writing. The book is quite evidently addressed to the economic group that can afford and can purchase satisfactory diets, though Chapter VIII comes to grips with the problem of low-cost meals. Such practical problems as meals at restaurants, drug store lunches, meals on trains, feeding children enroute are analyzed, and a plea is inserted for food purveyors to make it easier to get a good meal than to get a bad one. The box lunch for workmen or school children is presented in the light of its true importance as the source of one-third of the day's nutritional requirements.

The tabular material of the book merits particular attention, *e.g.*, The Table of Standard Weights for Men, on pages 64–65, A Table of Median Calorie Values of Common Foods, pages 76–81, Recommended Daily Allowances of Specific Nutrients, page 85, Marketing Lists (Low Cost and Liberal), pages 184–187, and the many menu lists throughout the book.

Chapter VI on vitamins contains much good advice, *e.g.*, "The necessary vitamins can and should be obtained by judicious selection and preparation of foods"; "nothing is to be gained by taking capsules which furnish vitamins in large excess"; "a wisely chosen diet can furnish all the necessary vitamins." Chapter VII really gets down to practical cookery and contains 35 pages of forms and information for survey of personal diets. The debunking of food fads in Chapter 10 can be helpful to many misguided enthusiasts.

Misstatements of fact in the book are rare. Such a one as the recommendation of cooked prunes as a source of vitamin C at breakfast should be taken with extreme caution. On the whole the book can serve as a guide to individual eating, or as a sourcebook of information for public presentation. The catch phrase title should not mislead the unwary about the simplicity of the material presented.

D. F. MILAM

We Fight Syphilis and Gonorrhea—*Prepared by Adult Education Materials Project, in coöperation with the Chicago Health Department—Syphilis and Gonorrhea Section. Chicago: University of Chicago,* 1942. *Teachers Book*—44 pp.; *Book I*—19 pp.; *Book II*—31 pp.; *Book III*—44 pp.

How to reach all levels of education and reading ability with the facts about syphilis and gonorrhea has always been a problem for the social hygiene educator. It is especially difficult to reach the adult who may be unable to read in any language or who may read only in a foreign language. The Adult Education Materials Project of the Work Projects Administration at the University of Chicago, has hit on a double-barreled solution—teach these people to read and at the same time give them the facts about syphilis and gonorrhea.

We Fight Syphilis and Gonorrhea is a series of three illustrated booklets and a *Teacher's Guide*. Books One, Two, and Three are each written at a different level of reading difficulty on the same subject, thus enabling the teacher to guide the reading of a class of varying educational training and background. Besides serving as basic texts

for the subject itself, these lessons also furnish material for the study of English—reading, pronunciation, grammar, spelling, sentence construction, and oral English.

The *Teacher's Guide* contains useful information on how to use the three lesson booklets. It includes material on class procedure, reading, spelling, and writing practice, testing the student's knowledge, and a list of suggested reading and visual aids. A wise word to the teacher warns against attempting to give personal advice. The teacher is told to direct inquiring students to clinics or physicians for detailed information or examination.

JOSEPH L. STENEK

With This Ring—*By Ethel Miller Nash. New York: Association Press,* 1942. 112 pp. Price, $1.50.

In a small volume of little more than one hundred pages, Mrs. Nash has covered the life cycle from the "falling in love" period through marriage, the care and training of children, including early religious training and adolescence—necessarily each phase cannot be covered adequately. One could wish that the matter of child care and training had been left for another volume.

Mrs. Nash's suggestion that the menstrual period be utilized as a "period of meditation" will seem to some inadvisable as well as impractical. The modern woman has, in the main, learned to place little emphasis on this period. This is due, in part, to more sensible dress, consequent improvement of health, and busier and more interesting opportunities in life. The chapter on religious education will interest a limited number of parents whose point of view agrees with that of the author. Others will differ widely.

The warning concerning "war-time marriages" is timely. The author says: "Marriages contracted in wartime are not different from those contracted in peacetime. It is rather that the difficulties of marriage are thrown into clear relief. The temptation is to reason that, because of the special circumstances, the ordinary rules of caution do not apply. Nothing could be further from the truth. Marriages should be entered into during a war emergency only after a more than ordinarily careful consideration has been given to all the elements involved. Categorical statements of a general nature are rightly suspect, but nevertheless it is possible to say that the presence of certain specific emotional and physical factors make marriage unwise in both wartime and peacetime!" Those factors are enumerated through examples of actual marriages.

VALERIA HOPKINS PARKER

Fundamentals of Psychiatry—*By Edward A. Strecker, M.D. Philadelphia: Lippincott,* 1942. 201 pp. Price, $3.00.

The purpose of this book is to bring psychiatry in a "usable form to the medical student and practitioner." Its compact form "will enable the reader to obtain with a minimum of time, a workable picture of the field of psychiatry—knowledge which constantly can be interwoven with his work." These statements from the preface are well borne out by the organization of the text, which deals briefly with all parts of the subject under consideration, from historical backgrounds to present-day problems engendered by war activities.

At the present time it is particularly important for all physicians to take an interest in psychiatric matters in the light of the special investigations in psychoneuroses, and psychosomatic medicine of the past few years, during which many interrelationships with all branches of medicine and with the social sciences have been demonstrated.

There are many relatively large tomes on psychiatry, available to students and others who wish to review the subject

or to inform themselves in detail on some particular topic in mental medicine. However, there is a definite need for this volume, which is handy in size and which presents highly complex subject matter authoritatively, without becoming involved in technical or theoretical considerations; moreover it is arranged for teaching purposes in accordance with the long experience of the author who has proved its value in his teaching activities as professor at the University of Pennsylvania.

The section on war psychiatry is highly modern and presents briefly the scope of the problems confronting psychiatrists in the present emergency, summarizing the important basic conditions that should be recognized and treated.

The book should prove to be a sound, useful source of information for all workers interested in the subject. The text is illustrated by graphs and has been adequately indexed.

NOLAN D. C. LEWIS

Bacteriology for Students of Medicine and Public Health—*By Einar Leifson, Ph.D., Medical Student Series, Fred C. Zapffe, Editor. New York: Hoeber,* 1942. 526 pp. Price, $5.00.

This is an attempt to present a new approach to the study of bacteriology. As expressed by the editor, the objective has been to "present what the student has time to read, and at a price he can afford to pay."

Dr. Leifson has succeeded very well in providing a streamlined text with a clear presentation of representative material drawn from the enormous field properly included under the term "Bacteriology." Five chapters are devoted to the general biology of bacteria, eight to the systematic study and classification of bacteria, and four to laboratory technic.

In addition, he has found time and space to correlate the subject with other fields. For example, six chapters relate bacteriology to immunology and host resistance. One chapter discusses the relations of bacteriology to agriculture and industry. Other chapters discuss biostatistics, epidemiology, mycology, parasitology. Nineteen chapters deal with diseases of major importance.

In theory, such correlations are sound. In practice, they are difficult to attain to the satisfaction of all. The underlying purpose of dividing medical teaching into various branches is that the student may get more adequate and intensive instruction in these particular fields. Correlations conducted by each branch separately involve repetition which may or may not be advisable. In this particular instance the incursion into the fields of biostatistics and of clinical medicine may be debatable.

The general plan for the chapters on disease includes brief discussions of prevalence, epidemiology, diagnosis, treatment, and control. Certainly valid objections can be raised to having diagnosis and treatment of disease discussed in a course in bacteriology given to students who as yet have no clinical contacts, by instructors who carry no clinical responsibility. To illustrate, it is easy for a bacteriologist to state, "The clinical diagnosis of scarlet fever usually offers little difficulty" (page 319). The clinician, no doubt, will raise his eyebrows over that statement, because of the difficulty experienced in deciding the diagnosis of the large number of atypical cases. In the chapters on disease there occur other statements to which objection may be made. Although of minor importance they detract somewhat from the value of the book as a whole.

It is in the chapters devoted more definitely to bacteriology that the author is at his best. He presents the material clearly and concisely. Perhaps he is too concise in some instances,

but every sentence is meaningful. Moreover, he has a happy faculty of introducing explanatory material not usually available in commonly used textbooks. The student learns why stains act as they do, why differential stains of the body, capsule, flagellae, etc., are possible. Biochemical explanation of cultural characteristics is a very helpful feature. Carefully prepared suggestions as to practical procedures are provided. Needed details as to culture media and animal inoculation are included. In fact, the pages are replete with information which the medical student can use with great profit. In this field, Dr. Leifson has made a definite and constructive contribution.

M. E. BARNES

BOOKS RECEIVED

INFANT AND CHILD IN THE CULTURE OF TODAY. The Guidance of Development. By Arnold Gesell and Frances L. Ilg. New York: Harper, 1943. 399 pp. Price, $4.00.

PRACTICAL SURVEY OF CHEMISTRY AND METABOLISM OF THE SKIN. By Morris Markowitz. Philadelphia: Blakiston, 1942. 196 pp. Price, $3.50.

THE STANDARD OF LIVING IN 1860. American Consumption Levels on the Eve of the Civil War. By Edgar W. Martin. Chicago: University of Chicago Press, 1942. 451 pp. Price, $4.50.

SERVICES TO THE ORTHOPEDICALLY HANDICAPPED. Report of a Study made under the auspices of the Trustees of the Widener Memorial School for Crippled Children and the Board of Public Education School District of Philadelphia. Philadelphia, 1942. 115 pp.

BUILDING MORALE. By Jay B. Nash. New York: Barnes, 1942. 154 pp. Price, $1.00.

CURRICULUM PROBLEMS IN HEALTH AND PHYSICAL EDUCATION. By Vaughn S. Blanchard. New York: Barnes, 1942. 128 pp. Price, $1.50.

THE FOOD YOU EAT. A Practical Guide to Home Nutrition. By Samuel and Violette Glasstone. Norman: University of Oklahoma Press, 1943. 277 pp. Price, $2.25.

COMMON EDIBLE MUSHROOMS. By Clyde M. Christensen. Minneapolis: University of Minnesota Press, 1943. 124 pp. Price, $2.50.

REGAIN YOUR FIGURE. How to Recover the Figure after Childbirth without "Strengthening" Exercises. By Lt. Col. J. K. McConnel. Cleveland: Sherwood Press, 1939. 128 pp. Price, $2.00.

PRINCIPLES OF MEDICAL STATISTICS. By A. Bradford Hill. 3rd ed. London: Lancet, 1942. 189 pp. Price, $2.25.

LABORATORY MANUAL ON FUNDAMENTAL PRINCIPLES OF BACTERIOLOGY. By A. J. Salle. 2d ed. New York: McGraw-Hill, 1943. 184 pp. Price, $1.50.

THE FREEZING PRESERVATION OF FOODS. By Donald K. Tressler and Clifford F. Evers. New York: Avi Publishing Co., 1943. 763 pp. Price $8.00 Domestic, $8.25 Canada and Foreign.

PROCEEDINGS OF THE NATIONAL CONFERENCE OF SOCIAL WORK. Selected Papers, Sixty-Ninth Annual Conference, New Orleans, La., May 10–15, 1942. New York: Columbia University Press, 1942. 670 pp. Price, $5.00.

ESSENTIALS OF NUTRITION. By Henry C. Sherman and Caroline Sherman Lanford. 2d ed. New York: Macmillan, 1943. 442 pp. Price, $3.50.

HEALTH IN THE NEWS. Highlights in the News from the Realms of Medicine and Public Health as Prepared and Presented Weekly over Radio Station WEAN in Providence, R. I., from Oct. 31, 1941, to July 29, 1942, by John E. Farrell. Rhode Island: Providence Medical Association, 1942. 113 pp.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Another Wind-blown Straw—Pulmonary tuberculosis in England increased during 1941 by 10 per cent over the prewar year, 1938–1939. In Scotland the increase is 18 per cent, and for non-respiratory forms the increases are 21 per cent and 28 per cent respectively in the two countries. Old, young and middle-aged groups were counted in the increases. In the young, tuberculous meningitis was the chief cause for the rise. The record hardly needs an inspired interpreter to read the handwriting.

ANON. Tuberculosis in War Time (An Editorial. Pub. Health. 56, 2:15 (Nov.), 1942.

Next Year's Babies—More and more, the nation's babies are being borne by very young women, but the proportion of these young women to all in the reproductive ages in decreasing. Absence of young husbands and marriageable young men will tend soon to decrease birth rates among these young women. Will the mothers—aged 30 or more—who have some children already, whose husbands are not subject to the draft, and who are now in a better economic position, help out to moderate the future unfavorable effect of war upon our birth rate?

ANON. Mothers Today Are Younger. Statistical Bull. (Met. Life Ins. Co.) 23, 11:1 (Nov.), 1942.

Outstanding Medical Achievement—Impressively reassuring is this analysis of pneumonia mortality. In five years the rate has decreased 63 per cent and the profile of the seasonal mortality curve has so flattened out in the five year interval as to be almost unrecognizable.

ANON. Pneumonia Death Rate Lowest on Record. Statistical Bull. (Met. Life Ins. Co.) 23, 11:8 (Nov.), 1942.

Dangerous Enthusiasm—Animals develop pronounced pathological calcification of various organs during experimental hypervitaminosis (D) with pronounced pathologic changes in teeth and jaws. This, warns the author, should discourage excessive and indiscriminate vitamin D therapy.

BECKS, H. Dangerous Effects of Vitamin D Overdosage on Dental and Paradental Structures. J. Am. Dent. A. 29, 17:1947 (Nov.), 1942.

Paratyphoid A and B and Friends—There are more Salmonella infections than health officers generally suspect. Similar epidemiologic behavior to paratyphoid A and B is often observed with other Salmonella species. A simplified typing method is urged.

BORNSTEIN, S. Epidemiologic Aspects and Laboratory Diagnoses of Salmonella Infections. New York State J. Med. 49, 23:2215 (Dec. 1), 1942.

Chips from Old Blocks—Commonly held assumptions that grossly overweight children are victims of endocrine dysfunction are not borne out by this study. Restricting diet and fluid intake and adding vitamins did as much good as the administration of glandular extracts, but no therapy was efficacious until children became old enough to want to lose the handicap of excessive fat.

BRONSTEIN, I. P., *et al.* Obesity in Children. J. Pediat. 21, 4:485 (Oct.), 1942.

One Truth That Shall Not Prevail—No evidence was disclosed in this controlled study that large doses of the ordinary vitamins have any effect upon colds when given to young adults on only a reasonably adequate diet. There is no cause to believe that this truth will affect the behavior of the millions who have succumbed to the advertisements which suggest that So-and-So's vitamin pills will cure all ailments known to man and beast.

COWAN, D. W., *et al.* Vitamins for the Prevention of Colds. J.A.M.A. 120, 16:1268 (Dec. 19), 1942.

Deaths in a Depression Decade—From 1930 to 1940 the expectation of life at birth rose from 59 to 63.3 years, the increase being twice as great among negroes as among whites (though the expectation for the latter is still more than 10 years greater). Except for heart disease, cancer, and diabetes, the mortality rate of each important cause of death in 1940 was below that in 1930, and the maternal mortality rate declined uninterruptedly throughout the decade.

DORN, H. F. Changes in Mortality Rates, 1930 to 1940. Pub. Health Rep. 57, 49:1858 (Dec. 4), 1942.

When Polio Threatens Again—Since poliomyelitis is probably acquired via the alimentary route, the oropharyngeal mucosa is obviously the first site of contact with virus from contaminated food or drink, and utensils or fingers. Virus administered to monkeys by stomach without mouth contamination supports this concept.

FABER, H. K., and SILVERBERG, R. J. Pathway of Invasion in a Cynomologus Monkey after Oral Application of Poliomyelitis Virus. Science. 96, 2499:473 (Nov. 20), 1942.

January Hot Weather Hints—Dengue, typhus and related rickettsias, relapsing fever, plague, and other infections that may await the traveler to warmer parts of this western world are briefly reviewed for the benefit of those about to divest themselves of their red flannels in favor of linen clothes and pith helmets.

FAUST, E. C. Diseases in Warm Climates. Pub. Health Nurs. 34, 12:663 (Dec.), 1942.

Pneumonia Types and Typing—Of this long and important paper, the nub that the health worker will want to remember is that, despite the great effectiveness of the sulfonamide drugs, there are some cases of pneumonia (especially of the higher pneumococcus types) that are helped by the administration of the homologous serum. Pneumonia typing is by no means a dead duck.

FINLAND, M. The Present Status of the Higher Types of Antipneumococcus Serums. J.A.M.A. 120, 16:1294 (Dec. 19), 1942.

Not a Very Good Year—In Canada, 1941 was a year of epidemics. Measles, scarlet fever, and mumps were all well above averages. Infant deaths were higher than the year before as were the tuberculosis death rate and those of most of the chronic diseases among the principal causes of death.

HEAGERTY, J. J. State of Health of the People of Canada in 1941. Canad. Pub. Health J. 33, 11:517 (Nov.), 1942.

Antidote for Cocksureness—Are you one of those who have become hypercritical of all governmental war efforts, poisoned perhaps by the continuous barrage of carping censure from our self-appointed Jeremiahs of press and radio? Then read this review of some of the "little" problems we have had to overcome in addition to the big ones of raising and equipping an army and a navy.

HOLMES, H. N. National Survival through Science. Science. 96, 2498:433 (Nov. 13), 1942.

Another Prop Neatly Pulled—On the other hand, are you one of

those ready-believers, who has assumed right along that chaulmoogra oil is a specific against leprosy and that the only considerations are early and intensive administration? After reading this paper you will no longer pontificate glibly upon the subject. It seems that the stuff is of extremely doubtful value!

McCoy, G. W. Chaulmoogra Oil in the Treatment of Leprosy. Pub. Health Rep. 57, 46:1727 (Nov. 13), 1942.

Testing Insanitary Glassware—Instead of swabbing the lips of drinking glasses the proposed method involves coating the glassware with a thin film of nutrient agar which encourages the organisms to grow *in situ*. The method is simple, requires no apparatus, gives direct and accurate results. Dramatically too.

Novak, M., and Lacy, A. M. A Quantitative Method for Determining the Bacterial Count of Glassware. Am. J. Hyg. 36, 3:316 (Nov.), 1942.

Peerings into the Virus Shadowland—Are viruses macromolecules or small organisms? In recent electron micrographs the virus particles seem to resemble bacteria. Rod shaped viruses, like many rod shaped bacteria are uniform in width but vary greatly in length. Particles of spherical viruses like most cocci have relatively uniform diameters.

Rawlins, T. E. Recent Evidence Regarding the Nature of Viruses. Science. 96, 2497:425 (Nov. 6), 1942.

Words That Butter Parsnips—For the responsible, ex-sanatorium patient who may become occasionally infectious, personalized health education may be the answer, and his schooling should be done while in the sanatorium. The public health nurse should be able to do the rest, if the education were adequate—which frequently it is not.

Soderstron, K. M. Management of Patients With Occasionally Positive Sputum after Apparently Adequate Therapy (and two companion papers). Am. Rev. Tuberc. 46, 5:483 (Nov.), 1942.

Fallibilities—Read this classic discussion of the present-day status of our treatment of venereal diseases even though you haven't the slightest professional contact with the subject—just for the exhilarating and pleasurable experience of seeing this so human presentation of a scientific treatise. Not twice in a blue moon will you run across as sparkling and provocative—and irritating—a paper as this. Incidentally you'll get the low down on "wonder cures," prophylaxis, and kindred controversial subjects.

Stokes, J. H. The War Time Control of Venereal Disease. J.A.M.A. 120, 14:1093 (Dec. 5), 1942.

ASSOCIATION NEWS

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Haskell R. Anderson, M.D., Blaine County Health Unit, Watonga, Okla., Director

Patrick C. Bruno, 655 Broadway, Revere, Mass., Health Officer and Milk Inspector, Revere Health Dept.

Edwin Bruce Godfrey, M.D., Court House, El Centro, Calif., Imperial County Health Officer

Erwin Goemann, Ph.G., 234 Main St., Ridgefield Park, N. J., Health Officer

Harold LeRoy Guterman, M.D., Dr.P.H., Cherry Creek Indian Reservation, Cherry Creek, S. D., Physician, U. S. Indian Service

O. Emerson Ham, M.D., 23 E. Charlton St., Savannah, Ga., Asst. City-County Health Officer, Savannah-Chatham Health Dept.

Albert B. Headley, M.D., 115 West 8th St., Cambridge, Ohio, Guernsey County Health Officer, Health Dept.

Phillip T. Hodgin, M.D., M.P.H., 111 North Jefferson, Rockville, Ind., Medical Director, Dist. Health Dept. 8

Richmond C. Holcomb, M.D., 306 S. Madison Ave., Upper Darby, Pa., Dist. Medical Director, Delaware and Chester Counties.

Hosmer F. Johnson, M.D., 612 Bridge St., Blackwell, Okla., Asst. Public Health Officer, Kay County

John Mack Kirby, M.D., 1830 Flower, Bakersfield, Calif., Kern County Health Officer

Irving H. Mauss, M.D., Court House, Hot Springs, S. D., Asst. Surgeon (R), U. S. Public Health Service; Director, Fall River and Custer Counties Health Dist.

Orville C. McCandless, M.D., 328 N. Locust, Marion, Kans., Director, Marion County Health Unit

Claude A. Selby, M.D., 1002 State House, Lincoln, Nebr., State Director of Health

George M. Shinners, M.D., 605 S. Adams St., Green Bay, Wis., Health Commissioner

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Martha Jane Spence, M.A., Dept. of Health, Columbus, Ga., Director of Laboratory

Engineering Section

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Bernard D. Tebbens, M.S., National Institute of Health, Bethesda, Md., P.A. Industrial Hygiene Engineer (R), U. S. Public Health Service

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Carl U. Fauster, Libbey Glass Co., Toledo, Ohio

Katherine Helzer, 700 Old Colony Bldg., Des Moines, Iowa, Assoc. Nutritionist, Agricultural Marketing Admin.

Frances MacKinnon, M.S., 1709 Washington Ave., St. Louis, Mo., Director, Nutrition Service, Midwestern Area, American Red Cross

Leslie W. Rowles, D.V.M., City Bldg., Topeka, Kans., City Veterinarian and Chief

Milk Sanitarian, City-County Health Dept.

Dr. Frederick Rubli, Productos Nestle, Ocotlan, Tal., Mexico, Scientific Adviser

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Howard A. Trumbull, Owens Illinois Glass Co., Toledo, Ohio, Merchandise Manager

Richard Viola, 5548 Delmar Ave., St. Louis, Mo., Acting Supervisor, Food Inspection Service, St. Louis Health Div.

Public Health Education

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T. W. Christiansen, Madill, Okla., Sanitarian, Tri-County Health Unit

Agnes E. Gerding, R.N., 22 East 38th St., New York, N. Y., Assisting Teacher in Health Education, Bronx Tuberculosis and Health Committee

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Public Health Nursing Section

Doris L. Achor, M.A., Lihue, Kauai, T. H., Chief Nurse, Territorial Board of Health

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Helen R. Postow, 1057 Hoe Ave., Bronx, N. Y., Asst. to the Statistician and Epidemiologist, Medical Branch, Headquarters Second Service Command, Governors Island, N. Y.

Unaffiliated

Hazel Merrick, D.D.S., 808 North Spring St., Los Angeles, Calif., Chief Public Health Dentist, Los Angeles County Health Dept.

Maurice S. Reizen, Medical Detachment at Large, Morrison Field, West Palm Beach, Fla., Adjutant, Station Hospital

DECEASED MEMBERS

Donald E. Cummings, Denver, Colo., Elected Member 1935, Elected Fellow 1941, Industrial Hygiene Section

Charles R. Hoover, Ph.D., Middletown, Conn., Elected Member 1930, Laboratory Section

Howard B. Mettle, M.D., St. Louis, Mo., Elected Member 1936, Elected Fellow 1939, Maternal and Child Health Section

Blanche Potter, New York, N. Y., Elected Member 1923, Unaffiliated

Arthur H. Thomas, Philadelphia, Pa., Elected Member 1913, Unaffiliated

DR. GEORGE T. PALMER APPOINTED TO A.P.H.A. STAFF

The American Public Health Association announces the appointment of George T. Palmer, Dr.P.H., of New York, N. Y., as Associate Field Director for the Committee on Administrative Practice, succeeding Benjamin G. Horning, M.D., M.P.H., who recently resigned to become Field Director for the W. K. Kellogg Foundation, Battle Creek, Mich.

Dr. Palmer has been Deputy Commissioner of the New York City Department of Health for the past nine years. He is a graduate of the University of Rochester in 1907 and the Massachusetts Institute of Technology in 1909 and he received his Dr.P.H. degree from the University of Michigan in 1920.

Beginning his public health service with the New Jersey State Department of Health, he was a Sanitary Inspector

until 1913, when he became chief of the investigative staff of the New York State Commission on Ventilation, engaged in experimental research in the ventilation of school buildings in New York City, in which he served until 1917. Dr. Palmer was commissioned Captain in the Sanitary Corps in the Army from 1917 to 1919, acting as assistant to Colonel Victor C. Vaughan.

He next became Epidemiologist and Deputy Commissioner in the Detroit Department of Health from 1919 to 1923, then returned to New York City, and for eleven years was Director of Research of the American Child Health Association. While in this position he directed a survey of health activities in the smaller cities of the country. This work was published under the title "A Health Survey of 86 Cities." Other work under his guidance during this period included the school health studies published in monograph form from 1929 to 1933 and the research study published in 1934 under the title "Physical Defects—The Pathway to Correction."

Dr. Palmer has been a member of the American Public Health Association since 1911 and has participated actively in its work. He is a Charter Fellow. He has served as Chairman of the Child Health Section and is now a member of the Governing Council. He has been a member of the Committee on Administrative Practice since shortly after its formation in 1920, was Chairman of the Sub-Committee on the Appraisal Form for City Health Work and guided this form through several revisions. At present he is Chairman of the Sub-Committee on the Manual and Appraisal of Local Health Work.

He is the author of many reports and articles on public health published in the *American Journal of Public Health* and elsewhere, and participated with Dr. Henry F. Vaughan and Dr. Victor C. Vaughan in the volume on "Epidemiology and Public Health."

For a number of years he has been a special lecturer on public health administration at the Massachusetts Institute of Technology, St. Johns University, and the Long Island College of Medicine in New York, N. Y. He is also Vice-President of the New York City chapter of the American Society for Public Administration.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

POSITIONS AVAILABLE

U. S. CIVIL SERVICE COMMISSION. Public Health Nursing Consultants, 5 grades. See November *American Journal of Public Health*, or write U. S. Public Health Service, Washington, D. C.

Merit System Council, Oregon State Board of Health and Crippled Children's Division, has announced merit examinations in practically all public health fields. See November *American Journal of Public Health*, or write H. J. Sears, Merit System Supervisor, P. O. Box 88, Portland, Ore.

Indiana State Personnel Division announces that applications may be filed for positions in orthopedic nursing, medical positions (5 classes), and local public health director. See November *American Journal of Public Health*, or write Indiana State Personnel Division, 141 South Meridian Street, Indianapolis, Ind.

Physician, man or woman, as director of Division of Maternal, Child and School Hygiene in southern city department of health. Woman physician with pediatric training preferred, public health experience not essential. To operate prenatal, infant and preschool clinics and promote school health program. Salary commensurate with ability and qualifications of applicant. Apply **Box J**, Employment Service, A.P.H.A.

Southern state department of health seeks several obstetric and pediatric consultants, requiring a minimum of a year's residency in a specialty, immunity to draft and preferably training in public health. Men and women are eligible. Salary $300 per month plus travel. Apply **Box C**, Employment Service, A.P.H.A.

Public Health Engineer and director of Division of Sanitation of a city and county health unit; population 145,000 in the Midwest. Salary $3,180 and travel allowance. **Box E**, Employment Service, A.P.H.A.

The Flint Civil Service Commission will consider applications for Executive Health Officer of the Flint Department of Health. Applicants must be medical graduates with a valid license to practise medicine in Michigan or eligibility for such license; also must have practised medicine and surgery for five or more years and had considerable experience in public health work. There will be no written test, qualification being judged solely from review of experience, education and training and an oral examination. Present incumbent is on military leave of absence under circumstances which will probably extend for a period of five years. Staff consists of over fifty professional and technically trained employees. Probable salary $5,400. Inquiries should be directed to Foster B. Roser, Director, Flint Civil Service Commission, City Hall, Flint, Mich.

MEDICAL OFFICERS NEEDED—TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority is in urgent need of medical officers who are not eligible for military service and who are willing to accept assignments to war industrial activities (construction, manufacture of war chemicals and manufacture of hydroelectric power) as their participation in the all out war effort. Responsibilities include physical examinations, industrial hygiene, care of injuries, medical care to families in remote construction areas and general public health responsibilities in construction camps and villages.

Salary ranges from $3,200 to $4,200 per annum with opportunity for promotion.

For further information write to Dr. E. L. Bishop, Director of Health, Tennessee Valley Authority, Chattanooga, Tenn., or to the Personnel Department, Tennessee Valley Authority, Knoxville, Tenn.

Public health nurses wanted for two-county unit in Michigan. Must be graduates with minimum of 4 months' public health training or 8 months' training under supervision. Salary $1,800 per year with travel allowance $35 to $41 per month. Must drive and own a car. Address Dr. Koupal, Director Alger-Schoolcraft Health Dept., Manistique, Mich.

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations will be held and the resulting lists are expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

INDUSTRIAL HYGIENISTS

The Research Section of the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., needs chemists, physicists, and medical technicians, as well as laboratory assistants in these fields. There is also opportunity for persons without college education, specific training or experience who are interested in such positions. Women now form one-third of the employees in the Research Section.

Wanted: School Dental Supervisor to administer and operate dental program in City schools and clinics in City 50,000 population. Salary $3,000 to $3,600 with travel allowance. Those interested should address Dr. W. A. Browne, City Health Department, Alexandria, Va.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

M.D., Dr.P.H., interested mental and industrial hygiene, chief of mental hygiene clinic, on staff of psychiatric hospital, speaker, writer, author of books on health, diplomate in psychiatry, professor of psychiatry. Ineligible for military service because of age, healthy, vigorous, able to work hard, now in private practice; would make sacrifice and accept decent but lower remuneration than present income if he could be employed in war industry, preferably New York, New Jersey, or Connecticut. United States citizen. Had important government job in last war. Speaks and writes several languages. **A-504.**

NEWS FROM THE FIELD

AWARD OF GORGAS MEDALS

The Association of Military Surgeons of the United States recently awarded the first three medals in honor of Major General William Crawford Gorgas to Brigadier General Jefferson Randolph Kean, retired, who was chief surgeon of the Department of Western Cuba in 1900; to Brigadier General Frederick Fuller Russell, retired, of the Harvard School of Public Health, Boston; and to Rear Admiral Edward Rhodes Stitt, who recently retired after 42 years of service in the Naval Medical Corps, including 8 years as Surgeon General. The medals have been provided by John Wyeth and Brother, Philadelphia, and consist of silver medals and checks for $500.

VITAMIN C PLACED UNDER ALLOCATION CONTROL

The War Production Board announced on December 15 that ascorbic acid (vitamin C) had been placed under allocation control through the issuance of *General Preference Order M-269*. Development of the use of vitamin C in food and medicinal production for the armed forces was the primary cause for the action, as production was formerly geared to meet pharmaceutical needs. Present production does not meet current estimated requirements, and although production capacity is being increased, demands for 1943 probably will be more than double the 1942 figures. Enough will be available, however, it was stated, for essential civilian use. The Quartermaster Corps of the Army is using large quantities of this vitamin in the "K" and "Jungle" rations and there is a substantial demand for Lend-Lease requirements. Sorbitol, which also has recently been placed under allocation control, is one of the principal raw materials needed for the production of vitamin C.

ROSENBERGER MEDAL AWARDED TO MISS LENROOT

Katharine Lenroot, Chief of the Children's Bureau of the Department of Labor, Washington, on December 18 received the Rosenberger Medal at a convocation of the University of Chicago. The award was in recognition of her 30 years of service to the welfare of children in North and South America. Miss Lenroot is a graduate of the University of Wisconsin, served with the Wisconsin Industrial Commission, and has been identified with the Children's Bureau since shortly after its establishment in 1912. She has served as Chief of the Children's Bureau since 1934.

PHILADELPHIA COURSE IN INDUSTRIAL MEDICINE AND HYGIENE

The Philadelphia County Medical Society and the Commission on Industrial Health and Hygiene of the Medical Society of the State of Pennsylvania have announced a postgraduate course in industrial medicine and hygiene to be offered in Philadelphia January 5 to February 27 under the direction of the Department of Public Health and Preventive Medicine of the University of Pennsylvania and the Woman's Medical College of Pennsylvania. The courses are timed from 4 to 6 P.M. on Tuesdays, Thursdays, and Saturdays, and include, among other subjects, Physical Factors and Hazards, Surgical Aspects, Disease Hazards of Industry, Toxicology, Practical Applications of Industrial Medi-

cine, Compensation and Medico-Legal Factors, and Plant Sanitation. The Chairman of the Committee in charge is Lt. Col. A. Parker Hitchens, M.C., U.S.A., Department of Preventive Medicine and Public Health, University of Pennsylvania and Sarah I. Morris, M.D., Secretary, of the Department of Preventive Medicine, Woman's Medical College of Pennsylvania.

NEW YORK CITY'S HEALTH IN 1942

Ernest Lyman Stebbins, M.D., M.P.H., New York City Commissioner of Health, reported on January 1 that the year 1942 recorded for New York City its lowest infant death rate and new low mortality rates were established for diphtheria, typhoid fever, pneumonia, tuberculosis, and appendicitis. The general death rate for 1942 was 10.0 per 1,000, the record low of 9.9 having been set in 1941. The birth rate was 17.4, the highest since 1930, and the infant mortality rate 28.8 per 1,000 births.

On the unfavorable side of the picture he recorded an increase in syphilis cases which previously had been decreasing substantially. Reported syphilis cases were up 13 per cent in 1942. The death rate from tuberculosis, all forms, per 100,000, was 46.3, currently arresting the slight rise in this rate in 1941.

In a population of over 7½ million persons there were 7 deaths from diphtheria during the year. Dr. Stebbins points out that there are 8 health districts within the city which had had no diphtheria deaths for at least 4 years, and one had had no deaths for 7 years. These districts average 250,000 population.

STAFF CHANGES IN THE MEDICAL DIVISION O.C.D.

Howard H. Potter, recently water works engineer of the Maine Public Utilities Commission, Augusta, has been appointed Regional Sanitary Engineer of the First Civilian Defense Region, O.C.D., with headquarters in Boston. John H. Brewster, New York, now of the Second Region, formerly served as sanitary engineer for both the first and second regions.

Dr. Mark V. Ziegler, Senior Surgeon, U. S. Public Health Service, recently Public Health Service District Director in the Third District, is now Regional Medical Officer for the Third Civilian Defense Region, with headquarters in Baltimore. Dr. Ziegler succeeded Dr. W. Ross Cameron who is now assigned to the Federal Housing Administration. Dr. Lloyd H. Gaston, formerly deputy chief of Emergency Medical Service in Michigan, is assistant Regional Medical Officer.

Dr. Ford S. Williams, recently Assistant Regional Medical Officer in the Ninth Civilian Defense Region with headquarters in San Francisco, has been transferred to the Eighth Region as Assistant Regional Medical Officer. He will be associated with Dr. Witten B. Russ in the Regional Office at Dallas, Tex.

DENTAL SALVAGE PROGRAM

R. K. White, Chief of the General Salvage Branch of the Conservation Division, WPB, announced that in collaboration with the American Dental Association, A National Dental Salvage Program has been organized and will be directed by the association among all members of the dental profession.

The program, calling for the conservation of all dental material and equipment as well as the scrapping of obsolete rubber and metal objects, has been initiated to function through local dental societies.

O.C.D. BULLETIN ON SANITATION

Maintenance of sewer service in bombed areas has been one of the major difficulties confronting municipal

authorities in cities under enemy attack. To assist American municipal officials and defense councils in planning for emergencies and for the restoration of normal service following damage resulting from enemy action, the sanitary engineering section of the Medical Division of the Office of Civilian Defense has issued its second sanitary engineering bulletin, "Municipal Sanitation under War Conditions."

Sanitation problems constituting grave dangers to public health may result from direct damage to sewers or from failure of the water supply, making water carriage facilities inoperable, the bulletin points out. To meet these problems, two measures are necessary: (1) strengthening of the municipal department responsible for sewer service in both personnel and material, and (2) coöperative planning with the local defense council and other municipal departments so that they may be integrated to function in an emergency.

The bulletin emphasizes the importance of accurate and complete information on the sewerage system, such as maps and records of all critical points at which a broken line would create a serious drainage problem and interrupt service over a considerable area. Inventories of material, personnel, and equipment that could be used in the event of necessity are of value, not only to the sewer department but also to other municipal departments, public utilities, or neighboring communities. Such inventories should even include the resources of local dealers or manufacturers of building material, explosives, pipe and equipment that could be used in reconstruction of sewers, the O.C.D. sanitary engineers advise. Another point stressed is that essential equipment, personnel, and material should be distributed throughout a city to avoid loss of equipment through a chance bomb hit and to lessen the possibility of being blocked from movement by obstructed streets.

It is urged that municipal departments work closely with defense councils in order that emergency functions may be carried out with a minimum of difficulty. For example, it is pointed out that in order to function, persons and vehicles must be identified by the proper Civilian Defense insignia. Telephone service must be integrated with that of the Control Center or it may not be available in an emergency.

Suggestions are given in the bulletin on repair of damage to sewers, including advice on inspection, emergency equipment, and special measures to provide for the flow of sewage during repair.

Three methods of emergency sanitation, to be used when interruption of water service makes water-carried waste impossible, are suggested in the bulletin: handling and disposal by individual householders, temporary disposal devices set up in territory adjacent to the affected area, and a scavenger system in which containers are collected and transported to a point of disposal.

One section of the bulletin is devoted to discussion of municipal waste collection and disposal in the event of enemy action. Little can be done to protect collection facilities against damage except to disperse collection units in several locations when not in use. New methods of disposal or changes in disposal site offer more difficulty than the maintenance of collection service. Usable material may be salvaged and combustible material may be burned near the place of origin.

The sanitary land-fill is recommended as the method of disposal that could be most readily adopted. The problem of operating an incinerator during a blackout is also discussed.

The bulletin gives brief suggestions for protection of plants, with references

to special publications of the Office of Civilian Defense on protective concealment, protective construction, and glass protection.

An appendix to the bulletin contains *Operations Letter No. 29* issued by the Office of Civilian Defense on "Utility Repair Squads" and *Operations Letter No. 37*, which explain how utility personnel may be authorized to perform their duties during blackouts; designs for emergency latrines or privies; photographs and description of a newly developed sanitary excreta bag, and a bibliography of recent literature pertinent to the subject.

SAN FRANCISCO OPENS THREE PROPHYLACTIC STATIONS

Dr. J. C. Geiger, Director of Public Health of the City and County of San Francisco, has announced the opening of three prophylactic stations to be operated by his department in coöperation with the Army and Navy. The personnel is furnished through the Army and Navy, and the supplies and equipment through the Division of Venereal Diseases of the San Francisco Health Department. The operation of the stations is said to be unique in that prophylaxis will be administered to civilians as well as to the armed forces. During the first month of operation 23 per cent of the service was to civilians.

In order to secure adequate publicity 5,000 lavatory placards were distributed through the city by members of the local health department and the armed services. Half a million leaflets advertising the locations of the stations have been distributed to armed forces in the San Francisco area.

LINDBERGH HOME TO BE V.D. TREATMENT CENTER

The New Jersey State Department of Health has announced that the former home of Charles A. Lindbergh near Hopewell will become a rapid treatment center for venereally infected women. The estate, which includes about 400 acres in the Sourland Mountains, was given to the State of New Jersey last year by Mr. Lindbergh and his wife. It will be operated under the direction of Dr. Glenn S. Usher, the Chief of the Health Department Venereal Disease Bureau.

PSYCHIATRIC SERVICE IN VENEREAL DISEASE CLINIC

Dr. J. C. Geiger, Director of Public Health, has announced the opening of the psychiatric service of the San Francisco City Venereal Disease Clinic. The psychiatric service is established as a special field study project by the U. S. Public Health Service and offers the only psychiatric service of this type that has been established in direct conjunction with a venereal disease clinic in the United States.

The service will be based on an individualized case study plan. The purposes and objectives of the psychiatric service of the clinic are to provide a reëducation and readjustment program for girls and women who offer a promiscuous sex history and who may spread or are spreading venereal diseases. In the venereal disease epidemiologic interviews on female patients reported as sources and contacts of venereal disease public health nurses and physicians secure information as to the socio-economic background of these patients. Those cases which show maladjustment will be referred to the psychiatric service which will evaluate each case referred and will attempt through the psychiatric and case work approach to offer these patients social and economic readjustment. This psychiatric service will not attempt to assist in the readjustment of confirmed prostitutes but only the non-professional, promiscuous cases.

No residence or financial requirements prevail in so far as the psychiatric

service is concerned, and the service is in position to consider cases referred from outside sources. Arrangements will be made with various nonofficial agencies to provide funds in certain instances to carry out recommended psychiatric treatment plans. Attempts will be made to relocate the patients through coöperation of official and nonofficial agencies concerned.

The medical director of the San Francisco City Clinic is the Chief of the Division of Venereal Diseases, Dr. Richard A. Koch. The Director of the Psychiatric Service of the clinic is Dr. Ernest G. Lion, who is instructor in psychiatry at the Stanford University School of Medicine. The personnel of the service will consist of the psychiatrist, a chief psychiatric social worker, an assistant social worker, with two clerks.

ENGINEERING DEPARTMENT AT NORTHWESTERN RECEIVES MAGNIFICENT GIFT

A bequest of more than 20 million dollars to Northwestern University in the will of Walter P. Murphy, manufacturer of railway supplies, who died on December 16, has been announced. The fund will be used to develop, maintain, and operate the Technological Institute of Northwestern University which was founded in 1939 with a gift of $6,735,000 from the Walter P. Murphy Foundation. The Board of Trustees of the university was given freedom in deciding how the funds should be used and it is provided that instruction in science to other than engineering students is permissible. A new building, erected recently at a cost of 5 million dollars, was dedicated in 1942 and houses the departments of civil, chemical, mechanical, and electrical engineering of the institute, and the departments of physics and chemistry of the university. It is operated on the "work-study" plan in which student engineers alternate 3 months of study on the campus with equal periods of work in coöperating industries. Approximately 95 industrial organizations in 13 states coöperate with the institute in its work-study program.

NATIONAL RESEARCH COUNCIL ORGANIZES COMMITTEE ON SANITARY ENGINEERING

A sanitary engineering committee has been organized at the request of the Surgeon General of the Army by the National Research Council through the Division of Medical Sciences, acting for the Committee on Medical Research of the Office of Scientific Research and Development. Through liaison officers, advice and assistance in regard to sanitary engineering problems are also furnished to the Navy and the Public Health Service.

In the formation of the committee, epidemiological and entomological advice was deemed necessary and personnel representing these sciences was included. Close liaison with the Office of the Surgeon General of the Army is maintained through the Sanitary Engineering Branch, Division of Preventive Medicine. The committee consists of Abel Wolman, Dr.Eng., Chairman; Kenneth F. Maxcy, M.D., Secretary; Harold E. Babbitt; F. C. Bishopp; V. M. Ehlers; Gordon M. Fair; H. A. Whittaker.

In the several meetings to date, the committee has devoted major efforts to the problem of procurement and training of the large number of sanitary engineering personnel required for essential war activities. In addition to the needs for sanitary engineers as commissioned officers in the Sanitary Corps of the Army, the U. S. Public Health Service and the Corps of Engineers utilize sanitary engineers on a civil service status.

The committee has also considered the sanitary engineering functions performed by the Sanitary Corps of the

Army with a view toward providing constructive suggestions on the many problems occasioned by the war, including the safeguarding of Army water supplies, the disposal of waste, and malaria control.

The program covering future activities of the committee includes a continuation of its present work on the availability of and the demand for sanitary engineering personnel; the orderly procurement of and assignment to military, semi-military, and civilian agencies of trained sanitary engineers, information on military sanitary engineering problems and their solution; and a consideration of post-war needs for sanitary engineers and the fields in which they may be most profitably utilized.

The committee has had strong liaison representation from the War Department, by the presence in the deliberations of Colonels Simmons, Hardenbergh, Prentiss, and Robinson; from the Navy by Admiral Stephenson and Commanders Cushing, Tinton and Burton; from the U. S. Public Health Service by J. K. Hoskins, and from the Selective Service in the person of Major Robert A. Bier. The National Research Council representatives in the deliberations have been Drs. Weed, Davison, Forbes, and Colonel Larkey.

LEPROSY IN THE UNITED STATES

Leprosy has been introduced into different areas of the United States with very different consequences. In Louisiana, Florida, and Texas the presence of imported cases has resulted in the establishment of foci in which the disease shows a strong tendency to perpetuate itself, while in the central northwestern states and in California the reverse prevails and the disease has shown little tendency to become established. Elsewhere in the United States leprosy transmission occurs so rarely that it is negligible from the public health point of view.

The data presented refer to experience with leprosy up to the present time. But in an age in which great changes, both social and economic, are occurring, no one can predict what unexpected influence these may have on the occurrence of leprosy as well as other diseases.

From: Observations on Epidemiology of Leprosy, by G. W. McCoy, Medical Director (R), U.S.P.H.S., *Public Health Reports*, 57, 51, 1942.

BUCHANAN MEDAL AWARDED TO SIR WILSON JAMESON

The British Royal Society, through its President, Sir Henry Dale, C.B.E., has announced that the Buchanan Medal of the Royal Society has been awarded to Sir Wilson Jameson, now Chief Medical Officer of the Ministry of of Health and the Board of Education. Sir Wilson was formerly dean of the London School of Hygiene and Tropical Medicine. He is an Honorary Fellow, A.P.H.A. According to the announcement, Sir Wilson's claim to the award is based on "administrative and constructive work" of outstanding merit in the service of hygienic science. Sir Wilson "has shown himself to be a man of stimulating influence and leadership, determined and persistent in his efforts to insure that advances of medical knowledge in the laboratory, the clinic and the field shall receive prompt application in administrative practice."

DR. JOHN L. RICE APPOINTED CONSULTANT TO LEDERLE LABORATORIES

John L. Rice, M.D., who recently resigned as Commissioner of Health, New York City, has joined the staff of the Lederle Laboratories, Inc., New York, as consultant to advise on developments related to public health. Dr. Rice is immediate past President of the A.P.H.A.

A native of Connecticut and a graduate of Wesleyan University and the Johns Hopkins Medical School, Dr. Rice

has held posts with the International Health Board, Rockefeller Foundation, as district state health officer in New York, as health officer of New Haven, Conn., and as Commissioner of Health of New York City. Dr. Rice has studied municipal public health in Europe and was a member of the commission sent to the Scandinavian countries to study venereal disease control in 1936.

Lederle Laboratories was founded in 1906 by another New York City health commissioner, Dr. Ernest J. Lederle. It is a producer of sera, vaccines and related medicinal products, and of drugs used in chemotherapy.

A luncheon in honor of Dr. Rice was given at the New York Academy of Medicine on January 21 by his friends and colleagues.

PUBLIC HEALTH NURSING IN WARTIME

The extraordinary demands of the times on public health facilities together with the shortage of health personnel now creates unprecedented problems for many health officers. Since public health nurses quantitatively represent a large portion of any public health staff, the attention of health officers is called to a statement, Maintaining Minimum Public Health Nursing in Wartime, recently prepared by the National Organization for Public Health Nursing. A copy of this statement has been sent by the N.O.P.H.N. to every full-time health officer in the United States.

NEW GRANT FOR TEACHING AND RESEARCH IN TROPICAL MEDICINE

A 5 year program of research and teaching in tropical medicine, supported by a gift of $150,000 from the Josiah Macy Jr. Foundation, New York, N. Y., was announced in January by Dr. Willard Cole Rappleye, dean of the College of Physicians and Surgeons of Columbia University and President of the Josiah Macy Jr. Foundation.

In announcing the gift Dr. Rappleye said that after the war it was expected that there would be an increase in the amount of tropical disease in this country because members of the armed forces will return in large numbers from countries where tropical diseases are widespread. He predicted that malaria and dysentery will be the two principal diseases. He anticipated also that increased economic and industrial aid will be provided by the United States government to tropical areas after the war, which will entail medical help to the native populations and will necessitate extensive training of doctors, nurses, and public health workers.

A regular department of tropical medicine will be set up in the De Lamar Institute of Public Health at Columbia University, of which Harry S. Mustard, M.D., is the Director. The Institute is housed in the Washington Heights Health Center, 600 West 168th Street, New York, N. Y. Coöperation is assured between the School of Tropical Medicine at the University of Puerto Rico, maintained by Columbia University, which will be used as one of a number of field stations where personnel may receive additional training in the courses to be offered.

DR. HALVERSON APPOINTED CALIFORNIA STATE HEALTH OFFICER

The appointment of Wilton L. Halverson, M.D., Dr.P.H., of Los Angeles, as State Health Officer of California has been announced by Governor Warren, to take effect in January. Dr. Halverson succeeds Bertram P. Brown, M.D., who has served for several years. Dr. Halverson was appointed County Health Officer in the Los Angeles County Department of Health in 1942 and has been given a temporary leave of absence from his Los Angeles County position. Dr. Halverson is a graduate in medicine of the College of Medical Evangelists and in public health from

Yale University. He was formerly the Health Officer of Pasadena and is Professor of Public Health and Preventive Medicine in the College of Medical Evangelists in Los Angeles.

PERSONALS

Central States

KENNETH E. BENNETT, M.D., of Strasburg, Ohio, has resigned as Health Officer of Tuscarawas County, to enter the U. S. Army Air Corps. BURT A. MARQUAND, M.D., of Dennison, will continue as Health Officer of Atchison until January 1, 1944.

BERT E. CALDWELL, M.D., who for 15 years has been Executive Secretary of the American Hospital Association, Chicago, Ill., has announced his resignation, effective on the appointment of a successor.

HARRY J. DEETHS, M.D., has been appointed Health Officer of Atchison, Kans.

ROBERT A. EVANS, M.D., of Columbus, Ohio, has recently been appointed Health Officer of Franklin County.

EARL E. KLEINSCHMIDT, M.D., DR.P.H.,* since 1938 Associate Professor and Chairman of the Department of Public Health, Preventive Medicine and Bacteriology at the Loyola University School of Medicine, Chicago, Ill., has been appointed Health Commissioner of Toledo, Ohio, succeeding JOHN L. LAVAN, M.D., DR.P.H.,* who recently resigned to become Director of Scientific Research for the National Foundation of Infantile Paralysis, New York, N. Y.

HAROLD F. MINSHULL, M.D., of New Lexington, Ohio, Coroner of Perry County, has been chosen Health Officer of the County, succeeding the late FRANK J. CROSBIE, M.D., of New Lexington.

WALTER N. MUNDELL, M.D., of Hutchinson, Kans., has been named Health Officer of Reno County.

MILTON E. PARKER,* Manager of Production for the Beatrice Creamery Company, Chicago, Ill., participated in a four weeks orientation course at the Command and General Staff School, Fort Leavenworth, Kans., "for civilians especially selected from among civic, business and professional leaders of the country" at the invitation of Lieutenant General Brehon Somervell, A.U.S. Mr. Parker has been serving for several months as special advisor, Military Planning Division, Research and Development Branch, Office of the Quartermaster General, Washington. He has recently been elected Chairman of the Chicago Section of the Institute of Food Technologists.

ERIC P. PFEIFFER, M.D., C.P.H.,† Director of the Division of Vital Statistics, Iowa State Department of Health, Des Moines, has been placed on leave in order to return to active duty in the Army.

Eastern States

OTTO A. BESSEY, PH.D., formerly research associate in pathology and associate in biologic chemistry, Harvard Medical School, Boston, Mass., has been named Director of the Public Health Research Institute of the City of New York, Inc., for the duration of the war, replacing RALPH S. MUCKENFUSS, M.D.,* who has been called into Army service. Dr. Bessey is also Chief of the Division of Nutrition and Physiology of the Institute. Dr. Muckenfuss's position as Director of the Bureau of Laboratories of the City Department of Health is being filled by WHEELAN D. SUTLIFF, M.D.,* as Acting Director.

JOHN R. PAUL, M.D.,† Professor of Preventive Medicine at Yale University, New Haven, Conn., delivered the third Harvey Society Lecture of the current series at the New York

Academy of Medicine in December. The subject was Poliomyelitis.

BRET RATNER, M.D.,† Clinical Professor of Pediatrics, New York University College of Medicine, has been appointed Visiting Pediatrician and Director of Pediatrics to the Sea View Hospital, New York, N. Y., to succeed BELA SCHICK, M.D., who has retired with the title of Consultant Pediatrician.

Southern States

JOHN F. BUSCH, M.D.,† has been appointed Director of the American Red Cross Medical and Health Service in the Eastern Area, with headquarters in Alexandria, Va., effective February 1. Since 1937, Dr. Busch has been Assistant to the Director of Tuberculosis Control in the Georgia State Department of Public Health, Atlanta.

JOHN L. DOROUGH, M.D., of Buffalo Cove, N. C., has been elected Health Officer of Cleburne, Ala., with headquarters in Heflin.

THOMAS H. D. GRIFFITTS, M.D., D.P.H.,† who until his recent retirement was Chief Quarantine Officer of Puerto Rico and the Virgin Islands, with headquarters in San Juan, is now Health Director of the consolidated health unit in Dade County, Miami, Fla.

WILLIAM P. JACOCKS, M.D.,† of Raleigh, N. C., at one time State Health Officer, has been appointed Director of School Health Coördination in the State Board of Health. The position is subsidized by the Rockefeller Foundation and is a joint project of the State Board of Health and the State Department of Public Instruction.

JAMES A. KENNEDY, PH.D.,* Professor of Public Health and Bacteriology, University of Louisville School of Medicine, Louisville, Ky., has been accepted for a course in tropical medicine at Tulane University of Louisiana School of Medicine, New Orleans, beginning January 4. This is one of the new fellowships recently established by the Association of American Medical Colleges under a grant from the John and Mary R. Markle Foundation. On completion of the course on February 27 Dr. Kennedy will return to the University of Louisville School of Medicine.

JOHN A. LINEBERRY, M.D., of Kenansville, N. C., has been chosen Health Officer of Harnett County, to succeed WILLIAM B. HUNTER, M.D.,† of Lillington, who has been called into active service.

FRANK M. MELTON, M.D., of LaGrange, Ky., has resigned as Health Officer of Oldham County.

HOWARD D. SCHMIDT, B.D.,† Director of the Division of Sanitary Engineering of the Tennessee State Department of Public Health, Nashville, has resigned to accept a position as Principal Sanitary Engineer at the Institute of Inter-American Affairs for work in South America.

GARLAND L. WEIDNER, M.D., of Elba, Ala., Health Officer of Coffee County, is now also in charge of Geneva County.

Western States

CLYDE A. BRIDGER,* who for 4 years was statistician with the Idaho Department of Public Health in Vital Statistics, Boise, is now instructor in mathematics at the University of Utah, Salt Lake City.

Canada

A. GRANT FLEMING, M.C., M.D., D.P.H., F.R.C.P.,* Strathcona Professor of Public Health and Preventive Medicine, McGill University, Montreal; and Medical Director,

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* Fellow A.P.H.A.
† Member A.P.H.A.